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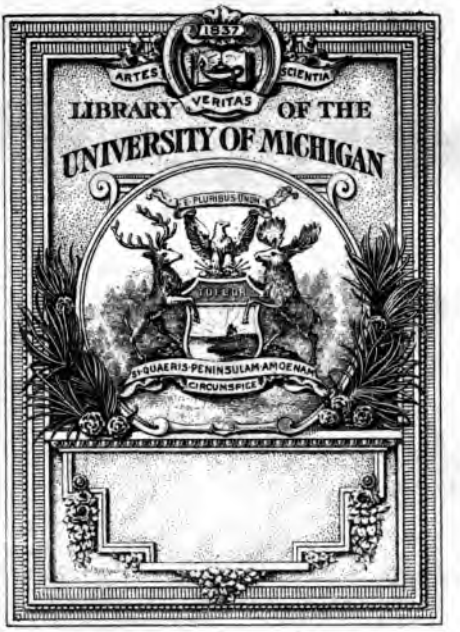
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ADVERTISEMENT.

In conformity with the plan announced to the Public, by the President and Council, in their advertisement to the sixth volume, the first part of the seventh volume, containing such papers only as have been received before the first of March, is now published; while those which have since been presented, and may be ordered for the press, will compose a second part, which is now preparing for publication, and will appear in the Autumn.

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CHEMICAL ANALYSIS

OF THE

MINERAL WATERS OF SPA.

By EDWIN GODDEN JONES, M.D.

Read June 18, 1815.

WE are indebted to the celebrated Bergman for the first scientific examination of the mineral waters of Spa. He did not however visit the fountains, and his analysis was confined to the water of the principal spring, called the Pouhon, a quantity of which had been sent to Sweden. Our countryman, Dr. Ash, not long afterwards went to Spa, and analysed, on the spot, five of the springs most known and frequented. In 1788 he published his "Experiments and Observations on the Mineral Waters of Spa and Aix-La-Chapelle, &c." which certainly contained the best account by far, that had ever appeared of the nature and composition of these waters, as also many judicious observations on their medicinal effects and application. Since the time of Dr. Ash, nothing, as far as I have been able to learn, worthy of the least attention has been written concerning them.

Having visited Spa in the course of last summer, I suspected from some partial examinations of these waters, that there were still many deficiencies and inaccuracies in the accounts which we hitherto possessed of them. This induced me to undertake their complete analysis, the results of which I have now the honor of presenting to the Society, premising a few details concerning the geological character of the country in which they are found.

SECTION I.

Situation of Spa.

Spa is distant twenty miles from Aix-La-Chapelle, and eight from Malmedy, in the neighbourhood of which are found several mineral springs, very nearly resembling those of Spa in their medicinal properties.

The district in which Spa is situated, is composed entirely of rude and sterile mountains, and forms part of the elevated tract of country, which extends from the borders of Champagne in France, almost to the banks of the Rhine, and is well known by the name of the Forest of the Ardennes. The whole country of the Ardennes is of schistose formation, but between it and the Meuse a range of calcareous hills of considerable extent is inter-

posed. This change in the geological features of the country is mostly abrupt, and marked by deep ravines and beds of rivers. The mountains of the Ardennes are of considerable, though not of great altitude; they are formed for the most part into long ridges, which, as they sweep across the horizon in unbroken lines, diminish their apparent elevation. They are generally rude, and, except in some of the vallies and gentler acclivities, uncultivated. Their summits are generally covered with heath, or with bogs and morasses; but their sides are frequently strewed with tall trees, or clothed with underwood.

The rock of the Ardennes consists chiefly of hard, compact, quartzose schistus, intersected with numerous veins of pure white quartz. It is often however found composed of micaceous schistus, clay slate, and in some places aluminous shale. The whole of this country abounds in ores of iron, and in mines of that metal; and Franchimont, as well as the neighbouring provinces of Limburg and Luxemburg, has for ages been famous for its forges and iron works. Chalybeate mineral springs, besides those of Spa and Malmedy, are of frequent occurrence in almost every part of the Ardennes.

The town of Spa lies a few miles within the western limits of the Ardennes, at the end of a long winding valley, through which a little river

runs. It stands in a small plain or meadow at the foot of a craggy precipitous mountain, two projecting masses of which form a sort of recess in the shape of a crescent, in which part of the town is built. This mountain lies to the north; the rock of which it is composed, consists chiefly of clay slate; but in some places a little to the west of the town, of aluminous shale.

To the south, the country rises by a more gradual swell, and terminates in a long mountainous semicircular ridge of several miles in extent, which half surrounds Spa, and forms a sort of vast amphitheatre, in the bottom of which the town stands. This ridge is a part of the heights called the *Hautes Fagnes*, and is supposed to be the most elevated point of the Ardennes. Its altitude has been estimated at 1100 feet above the level of Spa, which is itself said to be 1000 feet above the sea. Many of the mineral fountains have their sources on the side of this mountain.

The soil in the vicinity of Spa, like that of the rest of the Ardennes, is generally barren; but the country presents a great diversity of picturesque and romantic scenery.

Though this country abounds so much in mineral springs, copious streams of the purest water are every where to be met with. The water of the fountain which supplies the town for domestic

purposes, is purer and freer from all earthy and mineral impregnation, than perhaps any that has hitherto been examined. I found it by analysis to contain no more than 7.8 grains of fixed ingredients in three gallons, or 2.6 grains per gallon, which consisted of

Muriate of Soda - - -	0.5 grains.
Sulphate of Lime - -	0.9
Silex - - - -	1.3
Alumine - - - -	0.1
	2.6

It contained also a small quantity of atmospheric air, and some traces of carbonic acid, too minute to be estimated.

From hence it appears that this water is considerably purer, than that of the celebrated spring at Malvern; and must be similar, in its effects on the system, to distilled water:—a circumstance of considerable importance to invalids of delicate, irritable habits. There is no doubt also, but that this very pure water, like that of Malvern, may be employed medicinally in many disordered states of the system, to great advantage.

Lucas has enumerated sixteen mineral springs at Spa, and in its neighbourhood, and there are many more which burst forth among the moun-

tains, nameless and unknown. I shall however take notice of those only, which are much celebrated and frequented for their medicinal qualities. These are, the Pouhon, the Geronstere, the Sauviniere, the Groesbeeck, the two fountains of the Tonnelet, and the Watroz.

SECTION II.

Analysis of the Pouhon.*

I. *Situation.*

The Pouhon is the most frequented of all the mineral springs at Spa; it possesses the most active medicinal powers; and is the only one of which the water is exported, and known all over Europe by the general name of Spa water. It rises nearly in the centre of the town, which indeed has been gradually formed by the accumulation of houses round it. Its sources are probably in the mountain which rises immediately behind the town; and water of the same quality has been frequently found on digging the foundations of houses in its neighbourhood.

* Pouhon, as well as Sauviniere, in the Walloon dialect, are ~~genuine~~ true names for mineral fountains. The former of these is more commonly employed in the western, and the latter in the eastern parts of the Ardennes.

II. *External Qualities.*

The well of the Pouhon is generally full to within a few inches of its brim, where the superfluous water is carried off by a waste pipe. I could not ascertain exactly how much water this fountain affords in a given time, but the quantity every twenty-four hours must be very considerable; for besides what is drunk at the well every morning, the inhabitants are allowed to carry away as much of it as they please, which, as they use it for their common beverage, they are doing all the day: added to this consumption I have often seen five or six hundred bottles filled with it for exportation, in one morning, without the well appearing much the emptier.

Examined in the well, the water of the Pouhon appears perfectly colourless and transparent. Large bubbles of gas are seen continually rising through the loose stones at the bottom, which break with a hissing noise on the surface. The temperature of the water I uniformly found to be 50° Fahrenheit. Its specific gravity is 1.00098.

Fresh from the well the water of the Pouhon is highly transparent. Poured into a glass it sparkles, and the sides of the glass soon become studded with air bubbles, which also rise in

streams to the surface. In general it has no perceptible smell; but in the month of September, after heavy rains of some continuance, it had a decided one, like that of the Geronstere to be hereafter mentioned, but fainter. This circumstance of its acquiring an odour after much wet weather is noticed by Williams, who calls it a *Pyritish* smell. It has an extremely agreeable acidulous taste, mixed with a decided chalybeate flavour.

When a glass of the Pouhon water is exposed to a warm air, it parts with streams of air bubbles, soon loses its acidulous and chalybeate taste, becomes turbid, and at length lets fall a brownish yellow powder. The same phænomena take place, but with more rapidity, when this water is boiled.

III. *Examination by Re-agents.*

A. Experiment 1. Tincture of litmus dropped into the water was immediately reddened, but returned to its blue colour on standing for some hours.

2. Tincture of cabbage was at first reddened, but on suffering the water to stand, it passed gradually to a blue, and lastly to a green colour. The same effects were observed when syrup of violets was employed.

3. The water was instantly rendered turbid by a few drops of solution of acetate of lead, and soon deposited a milk white precipitate.

4. Lime water rendered it instantly turbid.

5. Barytic water occasioned a copious precipitate, which, except a minute portion, was soluble in muriatic acid.

6. It instantly became opalescent with a few drops of tincture of soap.

7. The concentrated acids produced much effervescence.

8. Tincture of galls instantly struck a deep purple, which, on standing, became intensely black.

9. The triple prussiate of potass and iron instantly produced a vivid blue.

10. Nitrate of silver occasioned a cloudiness.

11. Fluate of soda and oxalate of ammonia produced a white cloud.

12. Polished silver, mercury, bismuth, underwent no change in their lustre on being kept many hours immersed in the water, even when it had a perceptible odour.

B. In order to judge with more certainty of the nature of the substances contained in the Pouhon water, 462 cubic inches of it were reduced by boiling to 10 inches. During the evaporation, an iridescent film collected on the surface, and a copious brownish yellow precipitate was thrown down, which was separated from the fluid by filtration.

13. Slips of paper stained with rhubarb and turmeric, dipt into the clear filtered fluid, were instantly changed to a fawn colour, and litmus paper reddened with diluted vinegar, were restored to their original blue colour. Tincture of cabbage and syrup of violets were changed to green.

14. Upon dropping into a portion of the fluid some muriate of platina, no change ensued.

15. Tincture of galls and prussiate of potass did not effect any change of colour.

16. Oxalate of ammonia did not render it turbid.

17. Phosphate of ammonia did not occasion any precipitation.

18. To a portion of the fluid a few drops of very pure nitric acid were added. Nitrate of barytes was then dropped in, which produced a considerable precipitation.

19. The precipitate in the last experiment being separated by filtration, nitrate of silver was dropped into the remaining clear fluid, which produced an abundant white precipitate.

20. Upon some of the brown yellow powder, which was deposited during the evaporation of the water, acetic acid was poured; great effervescence took place, and much of it was dissolved. The insoluble part, consisting of a brown powder, was separated by the filtre.

21. The clear solution was found, on trial with the oxalate of ammonia, to contain lime. A solution of perfectly neutral carbonate of ammonia was therefore added, which threw down an abundant white powder.

22. The whole being filtered, a solution of phosphate of soda was dropped in, and a precipitate was formed on the sides of the glass, which from the white streaks it formed, when scratched, appeared to be triple phosphate of ammonia and magnesia.

23. Upon the brown powder remaining in Experiment 20, muriatic acid was poured, which took up most of it, but left untouched a greyish light powder, which, being examined by the blow-pipe, was found to be silex.

24. To the clear muriatic solution prussiate of potass was added, which immediately occasioned a dark blue precipitate which slowly subsided.

25. The blue precipitate being separated by filtration, water of ammonia was added to the remaining fluid, and a minute portion of earthy matter was thrown down, which was found to be alumine.

IV. *Conclusions to be drawn from the foregoing experiments.*

1. From what was observed of the external qualities of the Pouhon water, it certainly contained a considerable quantity of gaseous fluid.

2. From Experiments 1. and 2. the presence of an uncombined acid was obvious, and further that the acid was the carbonic, which was still rendered more certain by Experiments 3, 4, 5, 6, and 7.

3. Experiments 1. and 2. proved also that it contained an alkali, which was still more certainly shewn by 13.

4. It appeared from Experiment 14. that the alkali was not potass, and the inference therefore was that it must be soda.

5. The presence of a sulphate of some kind was

inferred from Experiment 18, and 16. 17. shewed that it could neither be sulphate of lime nor magnesia, which indeed might also be known by the presence of an uncombined alkali. It was therefore concluded that it must be sulphate of soda.

6. That it contained some muriatic salt was shewn by Experiment 19, and 16. 17. made it certain that it was neither with base of lime nor magnesia, and was therefore muriate of soda.

7. Experiments 11. and 21. 22. detected lime and magnesia, and 16. 17. shewed that they had been suspended by carbonic acid.

8. A considerable quantity of iron was discovered by 8. 9. and 24, and 15. shewed that it had been held in solution by the carbonic acid.

9. Experiments 23. and 25. detected silex and alumine.

10. Experiment 12. proved that it contained no discoverable quantity of sulphuretted hydrogen.

V. *Analysis.*

From the foregoing experiments a precise knowledge of the number and nature of the fixed ingredients was obtained as follows:

1 Carbonate of soda.
2 Sulphate of soda.
3 Muriate of soda.
4 Carbonate of lime.
5 Carbonate of magnesia.
6 Iron.
7 Silex.
8 Alumine.

With regard to the gaseous fluid, which the water evidently contained, the greatest part of it was undoubtedly carbonic acid gas. Whether there was any other substance of this class, mixed with it, was yet uncertain.

Nothing therefore remained to be done, to complete the analysis of the Pouhon water, but to ascertain the volume, and the nature of the gaseous fluids; and the respective quantities of the fixed ingredients that had been discovered.

VI. *Gaseous Contents.*

A bottle capable of holding exactly 15. 5 cubic inches, and fitted with a stop-cock, was plunged into the well of the Pouhon, and accurately filled. The stop-cock was then shut, and the bottle was immediately taken to my lodgings, not many yards from the fountain. A bent tube previously adapted to the stop-cock, was then fixed to it, and its recurved end placed in the mercurial trough,

under a proper graduated receiver. The bottle was immersed in a water-bath saturated with common salt. The gas came rapidly over, even before the water began to boil. The bottle was kept in the boiling water till no more bubbles of gas appeared. The quantity of gas was then accurately measured, and being reduced to the mean temperature, and mean height of the barometer, amounted to 17. 6 cubic inches, or 262 cubic inches in a wine gallon of the water.

On introducing some caustic potash into a jar of this gas, the whole was immediately absorbed, except a very small bubble of atmospheric air. The gaseous contents of the Pouhon water consisted, therefore, with the exception of a minute proportion of atmospheric air, of carbonic acid gas.

I repeated this experiment three times, at considerable intervals, and in different states of the atmosphere, and with so little variation in the results, that I think it probable, the gaseous contents of this water will be found very nearly the same in all seasons.

VII. *Quantity of fixed ingredients by evaporation.*

I next proceeded to obtain, by evaporation, the fixed ingredients of the Pouhon water in a solid form, for the purpose of ascertaining their total

amount, and as a previous step to the future operations of the analysis.

The degree of heat, at which the desiccation of substances is conducted, is so connected with the result of chemical inquiries, that it may be proper to mention in this place, the method I employed in these operations, and the range of temperature in which they were generally performed. The substance to be dried was placed in a glass capsule over the steam of water kept boiling, by means of a lamp, in a small vessel to which the capsule was previously fitted. By this mode the temperature was at all times nearly equal, if care was taken to keep the lamp tolerably well trimmed, and generally stood between 170° and 185°, beyond which it could scarcely ever be carried. The substances were kept in this degree of heat till the maximum of dryness was obtained, which sometimes required several hours. Whenever in the course of these inquiries a different temperature was employed, I have taken care to mention it.

Two gallons, or 462 cubic inches of the Pouhon water were taken from the fountain on the 21st of July, in very dry weather, when the spring was supposed to be the strongest. It was evaporated in an earthen vessel, down to about 10 inches, which, with the precipitate formed during

the process, were carefully removed into a glass capsule; the evaporation was then carried on to dryness in the apparatus, which I generally employed, as above described.

The residue obtained by the evaporation was in the form of a light powder, of a pale yellowish brown; its weight was found to be 54.2 grains.

It being generally believed that the contents of these waters varied considerably in quantity in different seasons of the year, and states of the atmosphere; I determined to repeat the experiment several times, and at considerable intervals, in order to observe what changes might take place during my residence in Spa.

Four hundred and sixty-two cubic inches of water were again evaporated on the 1st of August, after a continuance of dry, hot weather, during which the thermometer had often stood at 84°. The same operation was repeated on the 7th of August, when the heat had dried up most of the small springs and rivulets in the neighbourhood. A fourth experiment was made with the same quantity of water on the 20th of August, after a week's heavy rain. The evaporation in all these trials was conducted as in the first. The greatest difference in the quantity of residue ob-

tained from each of them did not amount to more than 1.1 grain. The average of the whole was 53.6 grains, or 26.8 grains per gallon of water. The differences being so inconsiderable, the residues of all the four evaporations were mixed together, and divided into four parcels each of 53.6 grains, for the purpose of being examined by distinct sets of experiments, that by taking the average results the analysis might be rendered as accurate as possible.

On the 15th of September, however, after a month's stormy weather and heavy rains, with the exception of a few intervals, 462 inches of the Pouhon water were evaporated as before, and afforded 64.6 grains of residue, which being considerably more than in any of the former experiments, was reserved for separate examination, to ascertain whether the relative proportion, as well as the total quantity, of the ingredients was changed. From this last trial it may be inferred, that the Pouhon becomes loaded with a greater quantity of fixed ingredients after long continued wet weather, and would probably therefore be found to contain a still greater in the depth of winter. The water had at this time a perceptible odour, but the volume of gaseous products was the same as in former experiments.

Examination of the fixed ingredients.

VIII. *Muriate, sulphate, and carbonate of soda.*

The average quantity of residue from two gallons of water, 53.6 grains, was put into a mattrass, and covered with eight times its weight of distilled water, which was made to boil for some time. The greater part remained undissolved. The whole was thrown on a filter, and the undissolved powder reserved. The fluid that passed the filter had a yellowish tinge.

Paper stained with rhubarb dipt in this fluid was changed to a fawn colour, and litmus paper reddened with vinegar, recovered its blue tint.

The aqueous solution was then evaporated to dryness. During this operation, minute chrystals of muriate of soda appeared, but too few to be collected. The dry mass was irregularly chrystalline, and weighed 8.8 grains.

I judged that the best method of discovering the proportions of sulphate and muriate of soda, would be to precipitate their acids. The chrystalline mass was therefore re-dissolved in a small quantity of distilled water, and nitric acid was then added to saturate the uncombined alkali.

A solution of nitrate of barytes was then dropt in, till no more cloudiness appeared. A white powder was deposited, which being collected and dried, weighed 1.4 grains, which, allowing 1000 grains of sulphate of barytes to represent 1416 of chrystallized sulphate of soda gives us 1.98 grains of the latter.

To the clear fluid from which the precipitate had been removed in the last experiment, a solution of nitrate of silver was added drop by drop. An abundant precipitate was immediately formed, which being dried and fused, produced 5.6 grains of luna cornea. This quantity, if we allow according to Dr. Marcet's experiments, 100 grains of muriate of silver to represent 41 muriate of soda, gives 2.32 grains of the latter in two gallons of the Pouhon water.

The aggregate weight of the muriate and sulphate of soda being deducted from that of the whole saline mass, leaves 4.5 grains for the quantity of the carbonate of soda.

The same experiments were repeated, with very trifling variations in the results, with all the four average quantities of residue: to avoid needless repetitions, the proportions above given are averages of all the results. But on examining the residue of the two gallons of water taken from the Pouhon

well, after much rainy weather, I obtained of sulphate of soda, 1.6; muriate of soda, 1.9; carbonate of soda, 4.0 grains.

It would appear therefore, that a long continuance of wet weather diminishes the quantity of these salts in the Pouhon water.

IX. *Carbonates of lime and magnesia.*

The portion of residue not dissolved in distilled water, was exposed for a month to the action of the sun and atmosphere, in order that the iron it contained might be peroxydated. It was then transferred to a phial and covered with distilled vinegar to the depth of an inch. Much effervescence took place, and the residue was greatly diminished in bulk. After it had stood a sufficient time, the clear fluid was separated from the residue, which appeared like a dark brown powder, by filtration.

It was then concentrated by evaporation, and while hot, a boiling solution of carbonate of potash was added; a very copious white precipitation immediately took place, which was collected, dried and weighed.

Upon this precipitate, sulphuric acid was drop-

ped a little in excess. The superfluous acid was expelled by heat. Boiling water was then poured upon it, to dissolve away the portion of sulphate of ~~alumine~~ magnesia that might have been formed. The whole was then filtered.

The clear filtered fluid was then evaporated to a quantity barely sufficient to hold the sulphate of magnesia in solution, in order to precipitate the little sulphate of lime it contained, which was carefully removed. A boiling solution of subcarbonate of potash was then added, and the whole was boiled over a lamp for a few minutes. A white powder was deposited, which was collected, dried and weighed.

The quantity of carbonate of magnesia thus obtained being deducted from that of the whole precipitate from the distilled vinegar, the remainder will represent the quantity of carbonate of lime.

This method of separating the carbonates of lime and magnesia, to determine their respective proportions, appearing to be susceptible of sufficient accuracy, I repeated it on another portion of residue of the Pouhon water. In my experiments on two other portions of residue, the solution in distilled vinegar was first precipitated by perfectly neutral carbonate of ammonia, which gave at once the quantity of carbonate of lime, and afterwards by

phosphate of soda, according to Dr. Wollaston's method. From the triple phosphate of ammonia and magnesia that was obtained, the quantity of carbonate of magnesia was inferred by calculation.

The average of four sets of experiments gave me in two gallons of the Pouhon water,

Of carbonate of lime, - - 19.75 grains.
carbonate of magnesia, - 3.6

But the portion of residue obtained from two gallons of the water after a month's rainy weather (64.6 grains) gave me

Of carbonate of lime, - - 27.65 grains.
carbonate of magnesia, - 5.95

from which we may conclude that the quantity of these earths in the Pouhon water is considerably increased after much wet weather.

X. *Iron.*

On the brown powder remaining after the action of water and distilled vinegar, diluted muriatic acid was poured and heat was applied. The greatest part of it was dissolved, leaving nothing but a small quantity of light powder of a dark grey colour. The clear fluid, which was of a deep golden colour, was separated from it by filtration, and made boiling hot.

A solution of a known quantity of the triple prussiate of potass which had been found by previous experiments, to contain 23 per cent. of iron, was also heated and dropt in. An intensely deep blue cloud was instantly formed. It was allowed to subside for three days, and the clear supernatant fluid was drawn off from the precipitate by a syphon. The precipitate was then thrown on a filtre and repeatedly washed. It was then calcined in a silver crucible with a little wax, and the quantity of iron known to be contained in the triple prussiate employed in the precipitation being deducted from its weight, the remainder gave the actual quantity of oxide of iron contained in the 53.6 grains of residue.

The method of ascertaining the quantities of iron by precipitation with triple prussiate of potash, is, however, liable to so many inconveniences, and has in it so many sources of error, as Dr. Marcet, in his masterly Analysis of the Aluminous Chalybeate in the Isle of Wight, inserted in the First Volume of the Transactions of the Geological Society of London, has pointed out, that I employed a different one in most of my other experiments on this and the other Spa waters.

The portion of residue resisting the action of water and distilled vinegar was treated as above with muriatic acid. To the clear solution, water of ammonia was added, which threw down a very

copious, brownish, light powder, which was separated from the fluid by the filter. It was then boiled in a strong solution of caustic potash, to remove the alumine which must have been precipitated with it. It was then washed, dried, and afterwards calcined with a little wax in a silver crucible, to bring it to an uniform state of oxidation, and its weight was then ascertained.

The average results of four sets of experiments, gave me in two wine gallons, or 462 cubic inches of the Pouhon water, 10.48 grains of oxide of iron.

But the residue obtained from two gallons of the water taken from the fountain after a month's rainy weather, was found to contain only 8.9 grains of oxide of iron. The general opinion, therefore, that the Pouhon water has weaker medicinal powers in wet seasons, on which account it is never bottled for exportation, except after continued dry weather, appears to be well founded.

XI. *Silex and Alumine.*

The grey powder resisting the action of the muriatic acid, as above stated, which could be nothing but silex, being collected and dried, amounted, on the average of four sets of experiments, to

4.52 grains for every two gallons of water; but in the residue from the water taken from the well in September, it amounted to 6.54 grains.

The alumine which the preliminary experiments had shewn to exist in the Pouhon water, was retained in one of the sets of experiments in the fluid from which the iron had been precipitated by triple prussiate of potash; and in the others in the solution of caustic potash in which the oxide of iron was boiled. From the former it was precipitated by carbonate of ammonia, and from the latter by muriate of ammonia. The results of these experiments gave 0.59 grains of alumine for every two gallons. But the residue obtained in September in wet weather contained 0.76 of alumine. From these experiments it appears, that the quantity of silex and alumine is considerably augmented in wet seasons.

XII. *Recapitulation.*

The analysis of the Pouhon water being completed, the results of it are presented at one view in the following Table, in which the proportions of the ingredients are calculated for the contents of *one wine gallon*, or 231 cubic inches, as follows:

	Average of four sets of experiments.		Last experiments after rainy weather.
Carbonic acid gas	262.0	cubic inches	
Residue by evaporation	26.8	grains	32.3 grs.
Which was found to consist of			
Sulphate of soda	0.92		0.80
Muriate of soda	1.26		0.95
Carbonate of soda	2.45		2.00
Carbonate of lime	9.87		13.82
Carbonate of magnesia	1.80		2.97
Oxide of iron	5.24		4.45
Silex	2.26		3.27
Alumine	0.29		0.38
Loss	2.71		3.68

The water of the Pouhon fountain therefore appears to be a powerful and highly carbonated chalybeate, containing more iron and particularly more carbonic acid, than almost any with which we are acquainted, and from these two ingredients are its medicinal properties to be estimated, for the others are in quantities too small to be taken into the account.

The Pouhon water, when inclosed in well-corked and well-cemented bottles, will preserve its original state for many years unaltered. This property, which it has in common with the other Spa waters, it owes to the great quantity of carbonic acid it contains. It is, however, from its more active medicinal powers, the only one that is exported. An improper custom prevails, when it is bottled for

this purpose, of leaving the bottles open for several hours, in order that part of the gas may escape, from an unnecessary apprehension that if it were all retained it would burst the bottles. This makes it much less agreeable, and perhaps also less efficacious when taken in other countries, than at the fountain. Prodigious quantities of it used to be sent to all parts of the world; but the modern methods of imitating mineral waters, and the interruptions which the agitated state of Europe has occasioned to commerce, have of late years much diminished the exportation of it, though it is still considerable.

SECTION III.

The Geronstere.

I. *Situation.*

This fountain is the next in celebrity to the Pouhon, and is distant about two miles from the town. It lies in the bosom of a thick wood, on the side of the long mountain ridge to the south of Spa, and about half way towards its summit.

This mountain consists of quartzose schistus; no clay slate or aluminous shale is any where found in the vicinity.

The quantity of water supplied by the Geronstere

is not by any means so considerable as that of the Pouhon, and when formerly it was greatly frequented, there was often not enough for all those who came to drink of it. It may afford five gallons every hour. When none of it is taken from the well, it overflows and runs into a deep ravine, leaving an ochrey deposit along its channel.

II. *External Qualities.*

The water of the Geronstere observed in the well is perfectly transparent, and bubbles of gas frequently rise from the bottom to the surface, but they are much less numerous than those which continually ascend in the Pouhon.

I found the temperature of this spring on several trials to be uniformly 49° Fahr. Its specific gravity is 1.0008.

Received into a glass it is perfectly clear and colourless. After standing some time, it throws up small bubbles of gas, becomes turbid, and a precipitate is gradually formed.

The most striking external quality of this spring is its peculiar disagreeable smell, which is immediately perceptible on going into the small dome that covers it, but is much stronger when a glass of the water is held close to the nose. This odour has always been considered to be identical with that of

sulphuretted hydrogen, and it was hence inferred that this water contained sulphur, to which many of its supposed virtues were attributed. The smell appeared to me however to be only a greater degree of that which is common to chalybeate springs, and which, as I before noticed, is emitted sometimes by the Pouhon, and to resemble rather that of common hydrogen gas, than the very peculiar fetid one of sulphuretted hydrogen. It is very evanescent, and disappears soon after the water is taken from the well, even when it is kept in corked bottles. The taste of the Geronstere is less acidulous than that of the Pouhon, but strongly chalybeate; it partakes also of the flavour of the substance from which it derives its smell, which renders it somewhat disagreeable.

III. *Examination by Re-agents.*

My first attention was directed to discover the cause of the peculiar smell of this spring: under the impression that, according to the common opinion, it proceeded from traces of sulphuretted hydrogen, though the quantity of it would be found very much less than was generally supposed.

Experiment 1.

A solution of acetate of lead was dropt into a glass of the water immediately on its being taken from the well. A cloud was immediately formed,

and a precipitate was soon deposited of a perfect white, which remained unchanged after standing twenty-four hours.

2. White oxide of bismuth, which I have found to be a delicate test of sulphuretted hydrogen, remained unchanged after standing twenty-four hours in the water.

3. Silver leaf, bismuth, mercury, underwent no change on being immersed for a length of time in this water.

4. The sulphuric, muriatic, and nitric acids affected no precipitation, nor produced any fetid smell.

5. The residue of the water procured by evaporation, and afterwards heated to 400° Fahr. emitted no sulphureous odour.

6. No vestiges of sulphur could be detected in the ochrey substance deposited by the spring, in the channel through which it runs from the well.

7. On nitric acid being poured upon the residue by evaporation, no smell was observed.

8. The gas was obtained from a considerable quantity of the water. It had no fetid smell, and was entirely absorbed by caustic alkali. On pour-

ing an acid on the alkali employed in this experiment, great effervescence ensued, but no smell of sulphuretted hydrogen.

10. Silver leaf and paper wetted with solution of acetate of lead immersed in this gas, did not undergo any change of colour, nor was the surface of the mercury over which the gas was received, at all blackened.

11. The other re-agents employed in the examination of the Geronstere, were the same as in that of the Pouhon; and they afforded precisely the same results as to the number and nature of the substances discovered, but indicated less quantities of them.

IV. *Results of the analysis of the Geronstere.*

The remaining part of the analysis of this fountain was conducted in the same manner as in the Pouhon: it would be unnecessary therefore to swell this paper to a greater length, by entering into all the details. The results of two sets of experiments, in each of which the residue of two gallons of water was employed, will be seen at one view in the following Table, in which the proportions are calculated for one wine gallon of the water, which was found to contain,

Carbonic acid gas	168.5 cubic inches
Residue on evaporation	12.5 grains
Which was found to consist of	
Sulphate of soda	0.62
Muriate of soda	0.64
Carbonate of soda	1.43
Carbonate of lime	5.20
Carbonate of magnesia . .	1.05
Oxide of iron	0.94
Alumine	0.19
Silex	1.40
Loss	1.08

V. *Remarks.*

From the above experiments it appears that the presence of sulphurated hydrogen in the Geronstere water, is at least extremely doubtful; and that if any do exist in it, the quantity is so small as not to be discovered by the most delicate tests. With regard to the nature of the substance from whence the peculiar odour of this fountain is derived, I have no direct experiment, as it was so evanescent that it could not be collected and examined. The smell, as I before observed, resembles that of many chalybeate springs, and is probably owing to a small portion of hydrogen gas, which may be evolved during the solution of the iron which the water contains, in the carbonic acid.

Upon the supposition, however, that this spring is highly sulphuretted, has a considerable part of its

celebrity depended, and a great deal of singular reasoning is to be met with respecting its virtues, founded upon this notion of its ~~evaporation~~ compositi, even in authors who wrote at no very remote period. It has been extolled and prescribed in many diseases, in which the other Spa waters were considered as poisons, especially in many affections of the lungs. Lucas, however, many years since denied that it contained a particle of sulphur, for which he is reproved by Dr. Limburgh, formerly a resident physician at Spa, with great violence and severity. Our countryman, Dr. Williams, joins the latter in the dispute. Dr. Ash believes in its containing sulphuretted hydrogen, though he relates the unsuccessful attempt of a chemical friend, to demonstrate its presence.

The foregoing analysis will, if its results be admitted, reduce this fountain to the rank of a simple chalybeate, resembling the Pouhon in the number and nature of its ingredients, but containing a smaller proportion of them, especially of iron; less indeed of the latter than any other of the Spa waters, and therefore possessing less active medicinal powers. This may however render it preferable in many cases, and from its being at some distance from the town, and pleasantly situated, the advantages of agreeable exercise are combined with its use, and have no doubt frequently had a considerable share in the cures it is said to have performed.

SECTION IV.

The Sauviniere.

I. *Situation.*

The Sauviniere lies about a mile and a quarter from Spa, a few yards from the road to Malmedy, and near a wild heath. It is on the side of the same mountain ridge as the Geronstere, from which it is distant about two miles.

The well is cut out of the schistose rock, through the fissures of which the water issues, and streams of air bubbles are continually rising to the surface. When this well is emptied, it fills again in about twenty minutes.

II. *External Qualities.*

The temperature of this spring is 49½°. Its specific gravity 1.00075. Taken from the well into a glass, it sparkles, emits air bubbles, and at length deposits a yellowish earthy sediment. It is sometimes entirely without smell, but has generally a perceptible odour like that of the Geronstere, though much weaker; hence it has also acquired the reputation of being a sulphureous spring. No traces of sulphur, however, are discoverable by the most delicate tests. The smell disappears almost as soon as the water is taken from the well. Its

taste is extremely acidulous and agreeable, and less chalybeate than that of the Pouhon.

III. *Results of the Analysis.*

Its phenomena with re-agents indicate the same substances as in the former springs.

The gaseous products were obtained by the same process as in the analysis of the Pouhon, 15.5 cubic inches of the water yielded 16.2 cubic inches of carbonic acid gas, without any admixture.

The average results of two sets of experiments, in each of which two gallons of the Sauviniere water were employed, are exhibited in the following Table. The proportions therein are calculated for the contents of one wine gallon, or 231 cubic inches of the water.

Carbonic acid gas . . .	241.4 cubic inches
Residue on evaporation .	8.50
Which was found to consist of	
Sulphate of soda	0.05
Muriate of soda . . .	0.25
Carbonate of soda . . .	0.60
Carbonate of lime . . .	3.50
Carbonate of magnesia .	0.60
Oxide of iron	2.10
Silex	0.40
Alumine	0.10
Loss	0.90

IV. *Remarks.*

Dr. Ash in his analysis of this spring asserts that it contains potash as well as soda, but his experiments to prove this are extremely loose and inconclusive. Not a vestige of potash could be detected in it by the very delicate test of muriate of platina, which I employed for that purpose.

SECTION V.

The Groesbeeck.

I. *Situation.*

This fountain is found in the same area, and within a few yards of the Sauviniere, which has just been spoken of. The well which contains the water, is a square of two feet, and its depth is about one foot. It is cut in the schistose rock, from the fissures of which the water rises, and copious streams of gas continually ascend in greater quantity and larger bubbles, than in any of the springs hitherto described.

The quantity of water afforded by this spring is nearly the same as that of the Sauviniere.

II. *External Qualities.*

The temperature of the Groesbeeck I found to be on many trials 49½° Fahr.; its specific gravity is 1.0007.

The taste of this water is extremely brisk and agreeable, with less of the chalybeate flavour than any of the other springs. I never found it to have any perceptible smell. In its other external qualities it resembles the fountains already described.

III. *Results of the analysis.*

15.5 cubic inches of the water gave 17.8 inches of pure carbonic acid gas. Two sets of experiments were then made, in each of which two gallons of the water were employed. The results of the whole gave the following proportions, for one wine gallon or 231 cubic inches of this water.

Carbonic acid gas . . .	265.0 cubic inches.
Fixed ingredients by evaporation	5.9 grs.
Which consisted of	
Sulphate of soda . . .	0.05 grs.
Muriate of soda	0.15
Carbonate of soda . . .	0.30
Carbonate of lime . . .	2.40
Carbonate of magnesia .	0.20
Oxide of iron	1.55
Alumine	0.10
Silex	0.60
Loss	0.55
	5.90

IV. *Remarks.*

Dr. Ash finds that the water of this spring also contains potash, even to the amount of two grains in the quart, which with one grain of soda which he also finds in it, amounts to more than half the weight of all the fixed ingredients I could discover in a gallon The delicate test of muriate of platina, in this as well as in the Sauviniere fountain, did not detect the slightest traces of potash.

The Groesbeeck and also the Sauviniere, but more particularly the former, have been greatly celebrated for their diuretic properties, and for their efficacy in nephritic complaints, which has been attributed to the considerable quantity of alkali they were erroneously supposed to contain. They are however waters of remarkable purity, as appears from the analysis: all the ingredients in their composition, except the iron, being in quantities so minute as to be scarcely appreciable, and as weak chalybeates highly impregnated with carbonic acid, they may be extremely useful in some nephritic and other cases where the Pouhon might not be so proper. Their agreeable acidulous flavour is also a great recommendation to them.

SECTION VI.

The Fountains of the Tonnelet.

I. *Situation.*

These fountains lie about a mile and a quarter from Spa, and about three quarters of a mile to the North-east of the Sauviniere, on a gentle ascent between the foot of the ridge on which the Sauviniere and Geronstere are situated, and the precipitous hills that rise immediately behind the town. The ground about them is in many parts wet and boggy, and covered with coarse grass and rushes, among which chalybeate waters ooze out in many places, and cover the vegetation with stains of ochre.

These fountains derived their name from having been originally received into a little barrel or tun. They have generally been described as one spring; but there are two principal ones differing somewhat in their composition, though within a few feet of each other; besides several of less note scattered about within a small space round them.

They both rise into square wells, cut in the schistose rock. Their brims are of blue lime-

stone, which is eaten like a honey-comb by the action of the water.

The first Tonnelet.

II. *External Qualities.*

The water of this fountain bursts up very copiously through the fissures of the rock, and with it a prodigious quantity of carbonic acid gas, which rises in incessant streams, and bursts in large bubbles on the surface, so as to give the well the appearance of a boiling cauldron, and with a noise that may be heard at some distance.

The quantity of water supplied by this spring is very considerable. When the well, which is two feet square, and twenty-nine inches deep, is emptied, it fills again in about eight minutes.

III. *External Qualities.*

The temperature of this spring I found to be 49½, the specific gravity of its water is 1.00075.

Received into a glass it is beautifully transparent, sparkles very much and immediately sends streams of air bubbles to the surface. It has a perceptible smell, of the nature of that of the Geronstere, but very much fainter. Its taste,

though decidedly chalybeate, is extremely acidulous, pungent and agreeable. When a large glass of it is taken, the gas often escapes from the stomach, and stimulates the nose as when brisk cider or soda water have been taken. It is the common beverage of the country people in its vicinity.

IV. *Results of the Analysis.*

By the method adopted in the examination of the Pouhon, 15.5 cubic inches of the Tonnelet water, gave me 18.8 cubic inches of pure carbonic acid gas; at its first bursting from the earth it doubtless contained a great deal more, but the gas rapidly escapes as soon as it comes under a pressure no greater than that of the atmosphere.

The other parts of the analysis were conducted as in former occasions, two sets of experiments were made, each with the residue of two gallons of the water; according to the results the following are the contents of one wine gallon of the first Tonnelet.

Carbonic acid gas . .	282.0
Residue in evaporation .	5.3
Which consisted of	
Sulphate of soda . .	0.06
Muriate of soda . . .	0.15
Carbonate of soda . .	0.20

Carbonate of lime . .	1.10
Carbonate of magnesia .	0.30
Oxide of iron . . .	2.70
Silex	0.60
Alumine	0.10
Loss	0.09

V. *The second Tonnelet.*

This fountain also is remarkable for the considerable quantity of carbonic acid it emits, which, however, does not rise in streams so copious nor agitate the water so much as in the former one. In all its external qualities it resembles the first Tonnelet, its temperature and specific gravity are the same.

VI. *Results of the Analysis.*

15.5. Cubic inches of this water gave 17.6 cubic inches of carbonic acid gas, which with the results of two sets of experiments, one made with the residue of two gallons, and the other of one gallon of the water, gave the following for the contents of one gallon of 231 cubic inches.

Carbonic acid gas .	260.6 cubic inches.
Residue on evaporation	3.7 grains.
Which consisted of	

Sulphate of soda	}	Quantities
Muriate of soda	}	not appreciable.
Carbonate of soda	.	0.1
Carbonate of lime	.	0.9
Carbonate of magnesia		0.2
Oxide of iron	. .	1.5
Silex	. . .	0.65
Alumine	. .	Quantity not appreciable.
Loss	. . .	0.35

VII. *Remarks.*

The most remarkable circumstance belonging to these fountains, is the great quantity of carbonic acid that issues from the earth with their waters; which is so much more than they can contain under the pressure of the atmosphere, that it is disengaged in copious streams, the moment they rise into the wells. This gas is formed in such abundance at unknown depths of the earth, about the sources of these fountains, that it not only escapes with their waters, but also through the fissures of the rocks in the neighbourhood. The venerable Mr. Briant, who is proprietor of the Tonnelets, and most of the lands for a considerable distance round them, and who resided at them, when Dr. Ash visited Spa, still continues to live there at a very advanced age. He repeated to me a remarkable fact relative to this

subject, which Dr. Ash has given on his authority, namely, that on sudden or remarkable changes of the atmosphere, the quantity of gas that streams through the fountains is remarkably increased, and at the same time the cellars of his own dwelling, and those of the neighbouring village of Nivesé become so filled with carbonic acid, that no animal can venture into them without perishing. These cellars are on the bare schistose rock, through the fissures of which the gas escapes.

These waters being so completely charged with carbonic acid, not only renders them highly pleasant and refreshing to the palate, but must give them medicinal properties of great value. The first of them contains more iron than any of the mineral waters of Spa except the Pouhon, but the second is to be ranked among the weaker chalybeates. The Tonnelets are also remarkable for the great purity of their waters, which, especially that of the second, contain scarcely an appreciable quantity of any other ingredient besides the iron.

Mr. Briant had in Dr. Ash's time constructed some convenient baths both hot and cold, which were supplied with the water of these springs. These baths still exist, and are much frequented. The hot baths are of the usual construction; there are two cold baths: the first is a plunging bath,

inclosed in a building. Its temperature is generally very near that of the springs themselves. The other is much larger, and stands exposed to the influence of the sun and atmosphere, and its temperature varies accordingly. It was supposed that baths of a mineral water so highly charged with carbonic acid, would be found of powerful efficacy in the treatment of many diseases. I cannot venture to give any opinion on the subject myself, nor do I believe that it has been yet determined by sufficient experience, what effects the external application of water charged with carbonic acid gas may produce on the system, or in what diseases it may be useful. The question, however, is here of very little importance, for the greater part of the gas is expelled from the water when it is heated for the warm bath, and it escapes very soon from the large surface of the cold ones; so that no other effects, than merely those of the temperature employed, as in baths of common water, are to be expected from them.

Notwithstanding the general identity of the nature of the waters of the Tonnelet, with those of the fountains before described, very different properties have been attributed to them, by some of those who have undertaken the province of directing the invalids, who resort to Spa, in the choice of the fountains they are to use. Thus, while the Geronstere has been extolled, for the

"balsamic" qualities it is supposed to derive from its sulphur, as an excellent remedy in diseases of the chest; the Tonnelets are said to contain a "sharp vitriol," absolutely destructive of the lungs. This idea of a sharp vitriol, with other opinions equally ridiculous respecting the nature of these excellent waters, have had the effect of almost exploding their use, and on my arrival at Spa, I found them nearly deserted except for the purpose of bathing. They were, however, formerly in high repute. They were greatly extolled by the celebrated Tissot who came to Spa on account of his health, and took them in his own case. They are also highly recommended by Lucas, Williams, and Dr. Ash; and I can myself bear testimony to their good effects, in several cases, in which I had an opportunity of seeing them employed.

SECTION VII.

The Watroz.

This spring is situated in a marshy bottom, between the Tonnelets and the Sauviniere; it flows into a ruinous open well, and is now almost deserted, though it had formerly a considerable reputation. The water is clear, but very few bubbles of gas are seen to rise through it in the

well. The quantity of water the Watroz produces is not great, and being greatly exposed to the influence of the atmosphere, its temperature is uncertain. Its taste is less acidulous than in any of the other springs I have described, but decidedly chalybeate. The results of the analysis, made with one gallon of the water, are as follow:

Fixed ingredients	9.3 grains.
Which consist of	
Sulphate of Soda . . .	imponderable
Muriate of soda	0.02
Carbonate of soda	0.10
Carbonate of lime . . .	1.40
Carbonate of magnesia . .	1.90
Oxide of iron	2.60
Alumine	0.60
Silex	0.90
Loss	1.80

This water has the reputation of being purgative, which induced me to be at the pains of examining it. The above results shew that it has no pretensions to any such property. It is the only one of these waters in which I found the carbonate of magnesia to exceed in quantity the carbonate of lime.

SECTION VIII.

General Remarks on the foregoing Analysis of the Spa Waters.

I. *Recapitulation.*

Having thus brought my analyses of these waters to a conclusion, I shall first present a general view of the results, and then offer a few remarks on the differences between my own, and those of Bergman and Dr. Ash.

TABLE,

Exhibiting the nature and proportion of the substances contained in one gallon of the respective Spa Waters.

FOUNTAIN.	Temperature.	Specific Gravity.	Carbonic acid Gas in cubic inches.	Solid Contents Grs.	Sulphate of Soda.	Muriate of Soda.	Carbonate of Soda.	Carbonate of Lime.	Carbonate of Magnesia.	Oxide of Iron.	Silex.	Alumine.	Loss.
Pouhon	50	1.00098	262.0	26.8	0.92	1.26	2.45	9.87	1.80	5.24	2.26	0.29	2.71
Geronstere	49½	1.0008	168.5	12.50	0.62	0.64	1.43	5.20	1.05	0.94	1.40	0.19	1.03
Sauviniere	49½	1.00075	241.4	8.50	0.05	0.25	0.60	3.50	0.60	2.10	0.40	0.10	0.90
Groesbeeck.....	49½	1.0007	265.0	5.90	0.05	0.15	0.30	2.40	0.20	1.55	0.60	0.10	0.55
1st Tonnelet	49½	1.00075	282.0	5.30	0.06	0.15	0.20	1.10	0.30	2.70	0.60	0.10	0.09
2d Tonnelet	49½	1.00075	260.6	3.70	*	*	0.10	0.90	0.20	1.50	0.65	*	0.35
Watroz			not ascertained.	9.30	.....	0.2	0.10	1.40	1.90	2.60	0.90	0.60	1.80
The Pouhon, after much wet weather.				32.3	0.80	0.95	2.0	13.82	2.97	4.45	3.27	0.38	3.68

* Quantity not appreciable.

On comparing together the results exhibited in the above Table, it will appear that these waters are all exactly of the same nature with regard to the substances which enter into their composition; and that, therefore, the only difference between them consists in the quantity and proportions of those substances, which they respectively contain.

II. *Results of Bergman's Analysis of the Pouhon Water.*

This distinguished philosopher examined the water of the Pouhon only; not having Bergman's essays at hand, at the moment I am writing, I have taken the following results of his analysis from Dr. Saunders's excellent book on mineral waters, according to which one wine gallon of the Pouhon water contains:

Carbonic acid gas . .	102.12 cubic inches.
Oxide of iron	4.48 grains.
Carbonate of lime . .	11.76
Carbonate of magnesia	35.68
Carbonate of soda . .	11.76
Muriate of soda . . .	1.376
Total solid contents . .	65.056

Bergman, as I have before observed, made his analysis of the Pouhon water in Sweden, and from what was said in sec. ii. and xii. on the improper

manner in which this water is bottled at Spa for exportation, it is probable that a very considerable part of the gaseous contents of that which he procured had escaped; which will serve to account for there being in his results 158 cubic inches of carbonic acid gas, less than in mine. The quantity of oxide of iron, according to him, is singularly near that which I obtained after a continuance of wet weather; his estimate of the muriate of soda does not differ considerably from my own; but he takes no notice of the existence of sulphate of soda, nor silex nor alumine in this water; and his proportions of carbonate of lime, carbonate of magnesia, and carbonate of soda, as well as the total amount of the fixed ingredients, are much greater than mine. It is difficult to account for these differences in our results, in a satisfactory manner.

Dr. Ash, from some particulars in Bergman's results, which did not agree with his own, conjectures that he never really examined the Pouhon water, but that of the Chevron or Bru near Malmedy, which has often been exported for Pouhon water, and marked as the Pouhon bottles are, to a considerable quantity annually; for the sake perhaps of avoiding a small duty levied at Spa, on all the water bottled there for exportation.

III. *Dr. Ash's Analysis of the Spa Waters.*

The following table offers a general view of the results of Dr. Ash's analysis. "They are," he says, "estimated, as if obtained from one quart *Winchester* measure, or 70.50 cubic inches, or from 32 to 33 ounces, according to the specific gravity of the respective waters."

FOUNTAIN.	Quantity of Water.	Solid Contents by evaporation.	Gaseous contents in ounce measures.	Aerated Lime.	Aerated Magnesia.	Aerated Mineral Alkali.	Aerated Iron.	Selenite.	Aerated vegetable Alkali.
	Ounces.	Grs.							
Pouhon.....	33	16.25	35.75	2.75	9.50	2.25	1.75	....	.....
Geronstere....	32.75	5.50	24.50	2.50	.....	1.75	0.75	0.50	.....
Sauvinière....	32.50	3.75	33.50	1.50	.....	0.75	0.50	....	1.00
Groesbeeck....	32.25	5.25	35.50	1.50	.....	1.00	0.75	....	2.00
Tonnelet.....	32.00	2.00	40.75	0.25	.....	0.75	1.00	....	.....

The gaseous contents of these waters, Dr. Ash found to consist entirely of aerial acid, except in the Geronstere, in which it was mixed with an uncertain proportion of hepatic gas.

In the above Table, the quantity of solid contents, of the respective waters, is much greater than in my results. Dr. Ash finds carbonate of magnesia in the Pouhon only, and its quantity is there much too great; the proportion of alkali is so large in all of them, that it would, as he supposes it does, communicate to them distinct medicinal powers, especially in the Pouhon where it is combined with so much carbonate of magnesia. He discovers vegetable as well as mineral alkali in the Sauviniere and the Groesbeeck, which certainly does not exist in them. Other differences in our results, will be found on comparing them. It might be more easy to account for many of these differences, if we knew the temperature, at which the residue of the waters by evaporation, and the proportions obtained of its component substances were dried, and also at what season and in what states of the weather, the waters subjected to experiment were taken from the fountains; circumstances concerning which, though they are so intimately connected with the results, we are left entirely in the dark. In some particulars, however, these differences can only be attributed to errors in the analysis, owing to the imperfect methods, which it appears by his work, he

followed in some parts of it. His manner of obtaining the gaseous contents of the waters, is sufficiently accurate, and the quantity of carbonic acid he finds in each of them, differs very little from that which is given in the results of my own experiments.

SECTION IX.

On the Medicinal Properties of the Mineral Waters of Spa.

The results of this inquiry into the composition of these celebrated waters, must lead us to consider them all generally as highly carbonated chalybeates, differing from each other in their medicinal properties, according only as they respectively contain more or less iron and carbonic acid, for the quantities of the other ingredients even in the Pouhon, are too inconsiderable to be taken into the estimate.

Ignorance of their composition, or a desire from interested motives, of throwing a veil of mystery over their real nature and application, have, however, attributed to every one of these fountains, distinct and often contrary medicinal properties. Most of the authors who have written upon them, have been careful in describing their respective virtues, and the particular cases to

which they are applicable; but there is scarcely a disease which, according to them, may not find its relief at one or other of these salubrious wells. The Geronstere, in particular, was supposed to derive from its pretended sulphureous nature, powers of a very different kind from those of the other fountains. Our countryman, Williams, who wrote so late as the year 1771, speaking of the Geronstere, says: "this curious medicine, thus exquisitely "formed by the hand of nature, produces effects "in many respects very different from those of "any other mineral waters about this place: its "inflammable parts make it a much more power-"ful medicine, for cold, melancholic, and leu-"cophlegmatic constitutions, and for infusing a "genial warmth into old and almost worn out "habits of body. But on the other hand this is "a very dangerous medicine to be ordered freely "to young persons of a sanguine constitution, "or where the nervous system is very irritable; "as it is not only active and penetrating to a "very great degree, but is also highly inflam-"mable, &c." He afterwards gives several cases in which the Geronstere had perfectly succeeded, after the other waters had failed, and *vice versa*. The analysis shews however, that this water must possess less active and stimulant powers than any of the others. It were useless to take any notice indeed of any of these opinions, if the same, or others equally absurd, did not still continue to prevail at Spa, and to direct the practice.

It must be admitted however, that the considerable variety, which is found in these waters in point of strength, may render them respectively more or less applicable in the treatment of particular diseases and habits of body. The Pouhon is a more powerful and active chalybeate than most of the mineral springs of this class with which we are acquainted, and in some diseases, and in delicate, irritable constitutions, its effects may be too stimulant; in such cases, the mildest of all these waters, that of the Geronstere, may be sometimes employed with advantage; the circumstance even of its being the least gaseous of them all, may, in a few instances, render it preferable to the others. In some diseases, copious dilution with one or other of the weaker and more gaseous springs, such as the Groesbeeck and second Tonnelet, the waters of which are also of remarkable purity, may be highly useful; in others it may be desirable that a considerable quantity of iron should be taken in a smaller bulk of aqueous fluid, in which case the Pouhon will answer the intention.

Considered as chalybeates, these waters may be advantageously applied to the treatment of the same diseases, for which other mineral waters of this class are resorted to, and the method of conducting a course of them must be generally the same. This subject is so well understood, and has been so well treated of by several authors,

especially by Dr. Saunders in his excellent treatise on mineral waters, that I shall confine myself to a few observations on those properties that belong more particularly to the mineral waters of Spa.

Chalybeate springs are found abundantly scattered over many countries; but the mineral waters of Spa possess a striking and important peculiarity in the great quantity of carbonic acid gas which they contain, and which is far greater than is found in any of the chalybeates in this island, or indeed, than in any others we know of, except perhaps the celebrated spring at Pyrmont. This abundance of carbonic acid modifies very much their effects as chalybeates. It makes them highly grateful and refreshing to the palate and stomach, exhilarates the spirits, adds wonderfully to their tonic powers, and at the same time renders them less heating. They are therefore frequently found admissible in various diseases and states of the system where most other chalybeates would be improper.

Another circumstance belonging to these waters, highly deserving of notice, is their very remarkable purity; the second Tonnelet for example, besides a grain and a half of iron, contains two grains only of the other fixed ingredients in a gallon. Even the Pouhon water which has the greatest quantity of fixed ingredients, must be considered as a very pure water. In this respect it has a decided advantage over the Pyrmont water, which,

though it closely resembles the Pouhon in the quantity of iron and carbonic acid it contains, is a very hard water, and apt to disagree with delicate stomachs. The great purity of the Spa waters, and the facility and rapidity with which they are taken up by the absorbents, together with the abundance of carbonic acid they contain, are circumstances of great importance, and from which, independently of their chalybeate properties, great advantages may be derived in many disordered states of the system.

With regard to the operation of these waters, on the secretions and excretions, their more regular determination is to the kidneys and skin, but particularly to the former; from their general stimulant powers, however, and perhaps from the mere bulk of the water, when it is taken in considerable quantities, they sometimes increase all the secretions. It is probably from the mere bulk of the water also, that they sometimes act considerably on the bowels, though they evidently possess no direct purgative qualities, and their more common effect is to induce a degree of constipation.

The most remarkable and immediate effect of these waters, is to occasion when first drunk, especially in certain habits, a considerable degree of determination to the head, vertigo and drowsiness. This property is indeed common to many other waters when drunk in sufficient quantity, but

the Spa waters possess it in a greater degree than almost any others. When a full draught of them is taken, especially on an empty stomach, and in hot weather, they seldom fail to produce a swimming in the head, and a kind of intoxication, which often continues many hours, and is generally followed by a strong disposition to sleep, if this be not guarded against by continually walking about or other exercise. Dr. Rutty thought that these effects were produced more particularly by the waters of the Geronstere; he attributes them to its supposed sulphureous impregnation. I believe, however, the contrary to be the fact. These effects are noticed not only by professional writers on the Spa waters, but also in the numerous volumes that describe the place itself, and the manner of living, and amusements there; in many of which the continual round of dissipation and constant activity observed among those who resort to these springs, is ascribed to the necessity they are under of being thus occupied, in order to keep themselves awake.

The effects of the Spa waters just mentioned, are no doubt to be partly attributed to the direct operation of the carbonic acid on the system through the medium of the stomach, as they take place very suddenly, particularly when the stomach is empty. But a less degree of the same symptoms is often observed, when considerable quantities of water, entirely free from carbonic acid or

mineral impregnation, are taken; which must be probably referred, according to the ingenious explanation of Dr. Wall, in his observations on the Malvern waters, to the temporary plethora of the vessels of the head, occasioned by the facility and rapidity with which the pure fluid enters the absorbent system.

This explanation is peculiarly applicable to the effects of the Spa waters; their great purity fits them to be easily taken up by the absorbents, which are probably at the same time excited into greater activity, by the stimulus of the carbonic acid and of the iron. This idea of plethora is strengthened by the fact, that the determination to the head, vertigo, &c. begin to diminish, and sometimes vanish altogether, as soon as these waters begin to act upon the kidneys, and to pass off copiously by those organs, which commonly happens in a few days. Their acting in this manner is generally considered as the surest sign, that their use will be attended with advantage; and this is so well known among those who frequent these springs, that the common inquiry is: "Si les eaux passent bien." Whenever they fail to do this, and if, at the same time, the determination to the head continue to be considerable and, be attended with feverish symptoms, their operation is unfavorable, and their further employment is not to be advised. The use of mild purgatives contributes very much to promote the proper action

of these waters, and should in most cases accompany at least the first part of a course of them.

The determination to the head, which the Spa waters are apt to occasion, is by no means to be overlooked in prescribing them. In certain habits it may render them altogether inadmissible; in others, it may suggest the propriety of employing blood-letting, either general or local, or other evacuations, previous to entering on a course of them.

From their sprightly, acidulous qualities, these waters are found to allay thirst better than common water; hence they are peculiarly grateful and refreshing in many cases of debility, attended with slow febrile symptoms, and a dry state of the tongue and throat. In many such cases they often prove highly salutary in relieving the fever and in restoring the tone of the system, where iron in any other form would be of doubtful application; but under such circumstances, the weaker fountains are generally to be resorted to in preference.

These waters have undoubtedly been found highly useful in various painful affections of the kidneys and bladder, particularly when attended with the discharge of bloody, purulent or fetid urine, whether arising from ulceration or calculous concretions, as Dr. Saunders and Hoffman

have observed*. The weaker springs may generally claim the preference in these complaints, and the Groesbeeck has hitherto been almost exclusively resorted to in them. The Baron whose name this fountain bears, who is said to have been cured of a severe disorder occasioned by calculi both in his kidneys and bladder, by the use of this water, as the inscription in Latin on the little edifice which he caused to be erected over the well, informs us. Dr. Ash relates an interesting case, which fell under his own observation of a boy five years old, who appeared to be wonderfully relieved, if not perfectly cured, of a calculous complaint by the copious use of this water. The Groesbeeck has been supposed to contain a considerable quantity of alkali, and to derive its virtues in these complaints from that circumstance. Dr. Ash thought he had discovered in it, and also in the Sauviniere, which is sometimes resorted to for the same virtues, carbonate of potash as well as of soda; and he makes the amount of both so great, that it would be sufficient to give them distinct medicinal properties. But I have already shewn that they contain no potash, and the quantity of carbonate of soda is so minute that it cannot be expected to produce the slightest effects. It is perhaps not easy to determine to what the solvent powers of these waters, if they really

* These effects of the Spa waters were known to Pliny, as appears from the quotation in the 1st Section of this paper.

have any, are owing; but they can hardly be supposed to possess the power of dissolving or removing calculi of any considerable magnitude. The good effects which they evidently do sometimes produce in the disorders, of which we are speaking, are probably to be ascribed to the rapidity and the quantity in which these pure liquids pass through the urinary organs, by which they prevent the formation of fresh calculi, and wash away the small ones already formed and by cleansing the ulcerated parts, they contribute materially to their healing. The carbonic acid and the iron which they contain are at the same time highly efficacious in restoring by their tonic powers, the healthy action of the diseased urinary organs; and in removing the general debility by which complaints of this nature are frequently accompanied. The efficacy of these waters in calculous disorders might probably be greatly increased by the addition to them of a small quantity of carbonate of soda when they are taken, which would give them solvent powers they do not at present possess; and I had an opportunity of recommending this plan in one case, in which it appeared to be followed by advantage. Though the Groesbeeck has generally been the fountain resorted to in calculous cases, there is no good reason for its being exclusively employed in them; and where they are attended with considerable languor and debility, it may be preferable to have recourse to the Pouhon.

In various disorders of the alimentary canal, the mineral waters of Spa have been often found of eminent use in removing the debility, and restoring the healthy action of those organs; but in such complaints, as they have of themselves no power of evacuating the bowels, it is generally proper to combine with them the use of some aperient. I have very frequently recommended for this purpose, some of the neutral purging salts to be dissolved in the water itself. It is worth remarking that the Pouhon water contains very nearly the same quantity of iron that the celebrated Cheltenham water does. An imitation therefore of the latter, and as far as I could judge a medicine of very nearly the same effects, is easily made by dissolving in the Pouhon, a mixture of sulphate of soda, sulphate of magnesia, and muriate of soda, in the proper proportions. I had opportunities of prescribing this imitation, with many good effects, in several cases where the real Cheltenham water would have been proper. In some disorders of the organs of digestion, such as foulness of the stomach, bilious vomitings, acidity and heart-burn, &c. a few grains of carbonate of soda dissolved in these waters may be extremely useful; they may be thus made to possess the properties of the seltzer water, in addition to their own, as chalybeates.

From the pleasant taste of these waters and their exhilarating effects on the spirits, they are largely

used at Spa as a table drink, and particularly for diluting the wine, with which they make a most agreeable and refreshing beverage. Syrup of raspberries, of currants, or of lemon, are also frequently mixed with these, which forms a delicious and salutary draught, especially in warm weather, and in this way they may be often employed medicinally with great advantage. The common people in the town of Spa drink no other water at their meals or when they are thirsty, than that of the Pouhon; I made some inquiries towards ascertaining what effects the continued use of so strong a chalybeate from early youth upwards had upon their constitutions; but I only found, as Dr. Ash had before observed, in speaking of the same subject, that they are in general a robust, healthy race, and not liable to any predominant disease. The agreeable flavour of these waters will prove no small recommendation of them with patients whose stomachs from long indisposition are become irritable and averse from any of the usual forms of medicines, as it will not only enable them to take them without repugnance, but to continue them with pleasure for a proper length of time.

In short; in various female complaints arising from relaxation and derangement in the uterine system, and in many other disorders incident to both sexes, besides those already mentioned, where chalybeates are indicated, these waters are particularly useful; while the abundance of carbonic acid

they contain, not only increases their efficacy, but communicates to them properties which render them applicable in many cases, where iron in any other shape would not be advisable.

In complaints of an inflammatory tendency, or accompanied by flushings of the face, full pulse and determination to the head, they are, like other chalybeates, evidently improper.

With regard to the manner of employing the Spa waters; the dose of them must be regulated by the effects they are found to produce in each individual case. It is safer to begin with a moderate quantity, such as a four or five ounce glass; this may be repeated four, five or six times a day, and be gradually increased till half a pint is taken each time, or till an evident effect is produced on some of the secretions; beyond this point it is perhaps useless and even improper to proceed. The enormous quantity of these waters which it is the custom at Spa to recommend, must have the effect of oppressing and debilitating, rather than of strengthening the stomach and the rest of the system.

Another custom has generally prevailed at Spa, that of ordering the whole, or the greater part of the water which the patient is to take, before breakfast. This is evidently improper, even when the whole quantity prescribed is a moderate one. It had certainly better be taken like other medicines

at proper intervals. When a considerable quantity is found necessary, the patient may employ a part of it as a table drink, either by itself or mixed with wine.

As these waters are so highly charged with gas, they are apt sometimes in delicate stomachs to occasion spasm and distension. To prevent these unpleasant effects it is a common and judicious practice at Spa, to recommend the chewing of a small quantity of aniseeds, carraways, or peppermint drops, which generally answers the intention.

The duration of a course of these waters should be from six weeks to two months, by which time they will probably have produced all the good effects that can be expected from them. When they are continued any longer, their stimulant effects begin to wear off, and they should therefore be discontinued, and resumed again, if necessary, after a considerable interval.

Exercise in the open air in a pleasant country, cheerful agreeable society, and a moderate share of amusement and dissipation are among the concomitants which contribute to the efficacy of the Spa waters. Early rising and taking part of the waters before breakfast may be also considered as highly conducive to their successful use. Exercise and early rising may however be easily carried to an excess, as is too often the case at Spa. I have seen

patients of weak and delicate habits persuaded, by grave advice, to leave their beds at four o'clock in the morning, ride to the Geronstere, deluge their stomachs with the water before breakfast, take a great deal of exercise during the rest of the day, and afterwards join in the amusements of the place till late at night. It is needless to enlarge on the absurdity of this conduct; and patients who are going through a course of these waters should regulate their exercise and their time of rising, as well as their manner of living in all other respects, by the same rules it would be proper for them to observe in following any other plan of medicine.

From what has been said of these celebrated fountains it will appear that their waters possess very considerable powers, which may be employed to great advantage in the cure of many diseases. There are several circumstances connected with these waters which greatly contribute to their efficacy; such are the pure mountain air, the amenity of the situation which tempts the invalid to active and agreeable exercise, and the manner of living generally observed by patients at Spa, which is on the whole highly conducive to the restoration of health. These advantages will always render this beautiful spot a favourite place of resort for invalids.

HISTORY OF TWO CASES

OF

ANGINA PECTORIS.

By SAMUEL BLACK, M.D.

OF NEWRY.

COMMUNICATED BY

DR. CURRY.

Read Jan. 23, 1816.

AT the time when my first observations on the disease which has been named Angina Pectoris *, were communicated to the public, the affection was by no means so well understood, nor the morbid changes of structure on which it appears to depend so thoroughly investigated and ascertained as they have since been. Many zealous and diligent inquirers have communicated to the medical world the result of their observations on this subject; but the learned and truly didactic work of Dr. Parry of Bath, has concentrated into one luminous point of

* The first of my papers is contained in the Fourth Volume of the Memoirs of the Medical Society of London, and was read to that Society, in March 1794; the second (Vol. VI.) was read in October, 1796.

view the scattered rays flowing from a variety of sources. I have, in the course of subsequent experience, met with two additional cases of this disease, in both of which, I have had an opportunity of ascertaining by dissection, the morbid changes of structure; and their coincidence with those formerly detailed, is so remarkable, that I trust the Society will consider the accumulated weight of evidence as worthy of being communicated to the public. It occurs to me that there are few diseases in which the morbid changes may be predicted with greater confidence.

The first of the two cases which I have now to notice, was that of Mr. Marron, an eminent schoolmaster, of this place, who, at the period of his death, was aged about 56. The circumstances of this case I must detail partly from memory, and partly from some short notes which I find in an old common-place book of that day. A history of the disease and of the appearances on dissection which I had drawn up was destroyed by a sinister accident. Mr. Marron had been through life a healthy man, not liable to gout, nor indeed to any other disease. He had, however, been exposed to bitter domestic affliction, having, by a consecutive train of calamity, lost a number of fine children, till at last he was left childless. His disease commenced in 1799. The first symptom was an intolerable sense of anguish under the sternum, seizing him while walking, especially if up hill, or at a pace at

all accelerated; accompanied by a severe pain diffusing itself from the chest to the left scapula, and down the left arm to near the elbow. The sensation was such as to impress him with an apprehension, that if he should advance another step, life would be extinguished. But on standing still, these symptoms immediately vanished. When matters had gone on in this way for nearly eighteen months, he began to be awaked out of sleep, by the nightly paroxysms. These admitted of a temporary and imperfect relief from opiates and cordials. About September 1803, he began to have decided indications of hydrothorax. These were repeatedly relieved by digitalis, squill, and the pil. hydrarg.; but uniformly recurred after a short interval. In a word, he spun out life in this miserable way till July 1804, when he expired rather suddenly.

The Dissection.

Permission being obtained to open the body, the first striking appearance was the degree to which the cellular membrane was loaded with fat. The cartilages by which the ribs are connected with the sternum, had become completely osseous. The cavity of the chest contained a large quantity of fluid. The heart was loaded with fat, large, flabby, and soft. The valves were all sound. There were several osseous scales on the internal surface of the aorta, near its origin. The coronary arteries (which are still in my possession) were ossified through their whole extent.

The second case which I have to narrate, was that of a lamented friend, the Rev. Joseph M'Cormick, many years vicar of Aghaderg, in the diocese of Dromore, but lately promoted to the rectory of Mealiff, in the arch-diocese of Cashel. Mr. M'Cormick was aged about 56, had been occasionally affected with gout, but neither frequently nor severely. He had been liable for many years to discharge of blood from the hæmorrhoidal vessels, without pain or external tumour. This had often been profuse, but had entirely ceased for three years or more, and he had become fat and rather plethoric. All his habits were those of the strictest regularity and temperance, and he was uniformly influenced by those principles of virtue, honor, and worth, that adorn and exalt the human character.

I visited him early in the month of January last, when I was enabled to ascertain the following circumstances.

Mr. M'Cormick had undergone much fatigue and anxiety during Christmas week, in visiting his parishioners for the last time, preparatory to his removal to the south of Ireland. On Christmas-day, he preached his farewell sermon. The emotions to which this gave rise on both sides were of a very warm and lively character, commensurate with the ardor of esteem and attachment subsisting between him and his flock. The peculiar services of the day were protracted to an unusual length, by which

he was much fatigued. His glebe-house was distant from his church about half a mile, and between them was a gentle acclivity. While ascending this, he was obliged suddenly to stand still on account of a feeling of exquisite distress in the chest, accompanied by such a sense of debility and sinking, as appeared to threaten instantaneous dissolution. When he stood still, these feelings immediately subsided; but were repeatedly renewed by renewed attempts to continue his walk. At length he got home with difficulty, and in a state of great exhaustion. This paroxysm was very easily renewed ever afterwards, by very slight muscular exertion; such as walking up stairs, dressing or undressing, going into the tepid bath, &c. was uniformly accompanied by a very painful sensation, to which he applied the term *scalding*, diffusing itself from the left side of the thorax towards the scapula, the œsophagus, and down the left arm to the insertion of the deltoid muscle, where it terminated.

It appeared to me altogether extraordinary, that this complaint should have risen to such an intensity in so short a time. However, on making minute inquiry, I found that he had occasionally been affected with feelings of the same kind for a length of time, perhaps three or four years, but that they had never assumed the same exquisite form as since Christmas-day. He had long been unable to walk up a hill, or against a strong wind, without having some degree of this peculiar anguish excit-

ed in the chest. He had, however, partly from his uncomplaining disposition, and partly from a reluctance to give alarm to his family, forborne to say much on the subject. I found farther, that he had for many years been prone to faint, more especially after dinner. His pulse was from 50 to 56, and weak. In the month of February he began to be attacked out of sleep by the nightly paroxysms.

From the distance of his residence, I had no opportunity of seeing him during the paroxysm; but he told me that his feelings on these occasions were as if every thing within *were at a pause*, or as if *he were just going to die*. It is deserving of attention, that, on many occasions, he was able, by getting out of bed, fixing himself in his arm-chair, and concentrating his attention on some interesting kind of reading, *to baffle the paroxysm*, as he expressed it. He also found relief from making a moderately full inspiration, retaining the breath and keeping the chest for a time in that state of expansion. He thought himself at all times the worse for eating, however moderately, and he had an unpleasant sensation both in manducation and deglutition, which indisposed him to the exercise of those functions.

In the month of March, the symptoms of hydrothorax were unequivocally marked, and the ancles became œdematous. These symptoms were effec-

tually relieved, for a time, by the digitalis and pil. hydrarg.; but they soon recurred. Towards the latter end of May, he went to Dublin, where he remained for some time under the care of Dr. Edward Percival, Dr. Mills, and Mr. Richards. About the 21st of June, he returned from Dublin to Rostrevor. The cellular membrane was now universally loaded with effused fluid, and the symptoms of hydrothorax so very urgent, that he could rarely get into the recumbent posture at all; and after infinite suffering and distress, sustained like a philosopher and a Christian, he expired on the morning of Thursday the 13th of July.

The Dissection.

The good sense and enlightened humanity of his friends anticipated my anxious wishes, and suggested to them the propriety of examining the body. That operation was performed in my presence, thirty hours after death, by Mr. Brown, staff-surgeon. On turning back the integuments, the cellular membrane was more loaded with fat than I had expected. On attempting to cut through the cartilages by which the ribs and sternum are connected, they were found so completely bony that the knife would make no impression on them, and Mr. Brown was obliged to use a small saw for that purpose. On laying open the cavity of the thorax, there appeared a very large effusion into the sacs of the pleura, to the amount of at least *eight* or *nine* pounds.

The pericardium did not partake of this effusion. The heart, considerably loaded with fat, was large, flaccid and tender, and deficient in that floridness which the healthy heart possesses. On its external surface, were several spots of the breadth nearly of a six-pence, of a palish yellow colour, but perfectly soft. The valves were all sound. The coronary arteries were ossified in a remarkable manner. They are in my possession. One of them divides, immediately after its origin, into three principal branches, every one of which is osseous through its whole extent: saving that the bony structure is interrupted at intervals. The longest branch, which is five inches long, is not pervious to the smallest probe for more than half an inch; the other two branches not so far. The other coronary does not divide into branches, but its calibre is perfectly obliterated, and they are all as rigid and incompressible as any other bone of the same diameter. About three inches of the aorta being cut out, its internal surface exhibits a number of osseous scales, surrounding more especially the origin of the coronaries. There is one very remarkable lamina of bone, one-third of an inch long, nearly as broad, and as thick as a shilling.

The lungs were perfectly sound, as were the abdominal viscera. Some adhesions between the omentum and the concave surface of the liver could not be said to form an exception.

I do not think it necessary (for it could not be useful) to trouble the Society with any detail of the treatment employed in these cases. It was, unfortunately, perfectly ineffectual. But I can refer, with great confidence, to Dr. Parry's work, already quoted, as containing the best and fullest instructions on this head that the present state of our knowledge admits of. I beg leave also to mention, with much approbation, a synoptical view of the subject given by Dr. Blackall, of Exeter, at the end of his Book on Dropsy. I shall, however, take the liberty of offering a few general remarks, which appear to me deserving of some attention.

1*st.* Of my four patients, one only had been liable to gout.

2*ndly.* Of the four cases, two terminated by a copious effusion into the chest; one by an effusion into the pericardium, and one without any effusion. This effusion is to be regarded as a mere effect or consequence of the original disease.

3*rdly.* In every one of the four cases, there was an ossification, more or less complete, of the cartilages of the ribs. This circumstance is curious. It would almost indicate the existence of an ossific diathesis, (if I may use that expression) shewing its influence beyond the limits of the arterial system.

4thly. The disease appears in general to be connected with a full habit, and an accumulation of fat in the cellular membrane. It may perhaps, in some instances, have some connexion with suppressed discharges. Mr. M'Cormick had, for a series of years, been liable to a bleeding from the hæmorrhoidal vessels, which had ceased for three or four years. But whether the cessation of this discharge and the commencement of the angina pectoris stood to each other in the relation of cause and effect, I shall not take upon myself to decide. The late Dr. Smyth, of Dublin, attributed the successful issue of one of his cases to large spontaneous discharges of a gleety ichor from the scrotum and anus.

5thly. From the statements in the last paragraph, the propriety and expediency of issues would seem to follow as a natural consequence. In Mr. Carson's case * they had, for a time, a very beneficial operation. But in Mr. M'Cormick's case, they were tried without advantage, as well as in Mr. Woodney's †.

6thly. It has been alleged, that the ossification of the coronaries should be regarded as the *consequence*, not the *cause* of the disease. It appears to me, that a controversy on this head would partake of the nature of a verbal dispute. If the ossification

* Medical Memoirs, Vol. VI.

† Ibid. Vol. IV.

of the coronaries be an effect of the disease, then we must look for the cause in that diseased action of these arteries, (whether it be of the nature of inflammation or of spasm, or some other specific action different from either) by which osseous matter is deposited in their coats; and thus we merely trace the chain of causation one link higher, without adding to our knowledge.

7thly. I think there is a foundation for Dr. Parry's classification of this disease under the genus, Syncope. I have stated that Mr. M'Cormick had for several years been liable to occasional faintings, and certainly the paroxysm seems to consist very much in an impediment or suspension of the vital action of the heart.

8thly. I have stated it to be my opinion *, that the primary and original cause of this disease, is, perhaps, *in every instance* an ossification of the coronaries. This proposition is perhaps too general, and some qualification of it may be more reconcileable with the reserved spirit of just induction. But if I am permitted to subjoin these words, viz. "or some organic lesion, most usually of an osseous nature, existing at the origin of the circulation," the proposition will then be as true as most others in pathology. It does not appear to me, that the idea thrown out in my first paper †, that me-

* Medical Memoirs, Vol. VI.

† Ibid. Vol. IV.

chanical pressure alone is capable of producing all the symptoms,—has been at all supported by subsequent experience. The opinion was founded chiefly on the dissection of the body of R. M. Esq. given by Dr. Fothergill *.

9*thly*. The powerfully pernicious influence of strong mental emotion, or of depressing passion, is strikingly illustrated by the history of Mr. M'Cormick's case. I have no doubt that the foundation of this disease had been laid years ago. But the occurrences of Christmas week, and the prospect of an immediate separation from his beloved friends and flock, brought it suddenly to a crisis, which I think it would not have arrived at so rapidly, except through the operation of some powerful cause of this kind. It seems deserving of attention also, that Mr. Marron had been, for the latter years of his life, exposed to the influence of a similar cause, grief for the loss of his numerous family; and in Dr. Parr's case, narrated by Dr. Blackall, the patient was seized with his disease immediately after an imprisonment on account of debt.

10*thly*. There is nothing in the history of this disease more remarkable, or to me more inexplicable, than the exemption of the female sex from its attacks.

* Med. Observations, Vol. V.

11*thly*. When we call to our remembrance, that the disease appears in general to have some relation to obesity, or to a plethoric habit,— that the great majority of the subjects of it seem to have belonged to such a rank of society, that we must presume they sat down daily to a plentiful table,—that every thing which hurries the circulation, or urges the machinery by which that function is carried on beyond its capacity of performance, seems to create, or to favour the tendency to paroxysms;—and lastly, as the hope of a cure from medicine seems (in the present state of our knowledge) very slender, I ask, would it be irrational to propose the trial of a regimen as low and abstemious as is compatible with life? I am far from proposing a general rule applicable to every possible case: for something must depend on the constitution and habits of the patient; and much on the discernment and good sense of the physician. Should, however, such a trial be made, undoubtedly it should be on the very first threatening of the disease: for if that be completely established, success could not be expected.

"Principiis obsta: sero medicina paratur,
"Cum mala per longas invaluêre moras."

The systematic pursuit of such a plan, would require a degree of firmness and vigour of mind with which the generality of men are not gifted; and the occasions are numerous on which it may be ex-

pedient to remember in a medical sense, what Tacitus lays down in a moral one. " Naturâ tamen infirmitatis humanæ, tardiora sunt remedia quam mala."

But should the disease occur in a person so endowed as to be adequate to the trial, he might possibly, under a prudent physician, think it worth his while to try an experiment, the efficacy of which is yet to be ascertained.

HISTORY

OF

A VERY FATAL AFFECTION

OF THE

PUDENDUM

OF

FEMALE CHILDREN.

By KINDER WOOD, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, AND SURGEON IN OLDHAM.

COMMUNICATED BY

Mr. ABERNETHY.

Read Dec. 12, 1815.

THE disease to which I wish to call the attention of the Society, has attracted so little the notice of medical authors, and is so extremely fatal, that I trust no apology is necessary for throwing together such remarks upon it, as have occurred from time to time in the course of my practice.

Of this affection I have seen twelve cases, all occurring in patients between one and six years of age: of these only two recovered, and they were the only cases in which my attendance was required early in the disease. My notes of these two

cases have enabled me to describe the earlier appearances of the disease. The great rapidity with which it proceeds to an extent, which the tender constitutions of infants and children are unable to support; the insidious manner of its first appearance; the similarity in its commencement to some ordinary affections of the parts; its novelty, for I have always seen parents more surprised than alarmed; all these circumstances contribute to that period being passed over, when alone medical means can be serviceable.

The commencement of this affection is attended with chilliness succeeded by heat; slight pain in the head, dulness, nausea, loss of appetite and thirst; the tongue has a clay-coloured deposit; the bowels are torpid, and the patient is languid, inert and listless. These symptoms precede the affection of the pudendum about three days. The patients first call the attention of parents more particularly to the seat of the disease by complaints of pain in voiding urine, or when too young this is observed by the cries and struggles of the child during the act of emptying the bladder. When the genital organs are examined, one or both labia are found inflamed and enlarged, the inflammation is of a dark tint, and soon extends internally over the clitoris, nymphæ and hymen; the pain in voiding the urine may induce a supposition that the inflammation extends into the urethra, and a thin secretion, which at this period may be observed coming from

these parts, renders it not improbable that the lower part of the vagina may be affected.

From this period of the formation of the inflammation so rapid is the progress to ulceration, that scarcely twenty-four hours elapse before a number of small vesications forming within the labia, as well as externally, burst and form so many open surfaces which, quickly spreading into each other, form larger ulcers; this was the progress in one case, in the other the skin opened without any previous vesication. The thin discharge which the inner membrane secretes, is now mixed with the secretions from the ulcerations, and is dark coloured, peculiary offensive, and copious, irritating the adjacent parts, and contributing to extend the disease along the perineum to the anus, and to the inner part of the top of the thigh, contiguous to the labia. I have also seen the inflammation spread over the mons Veneris, and be succeeded by deep ulcerations progressively extending as long as life continued.

The pulse is quick and irritable after the inflammation commences, and as the ulceration extends, the face becomes of a peculiar pallid hue, the skin having a very singular whiteness, which I have never seen absent after the ulcerations had formed. As the bowels are slow at this period, the opening remedies uniformly bring away dark, slimy and offensive stools; and in two or three cases I have

seen aphthæ spread extensively around the anus, and over the perineum, and most extensively in a case which I shall have occasion to detail.

The ulcerations in this affection are not of an equal depth, or appearance, but various in this respect, as well as in the state of the bottom, which in some places is foul as well as deep, in others superficial and sprinkled with small red granulations.

It may be easily conceived that in such a state of the organs of generation, the pain upon moving the pelvis is excruciating, and hence the patients, when sufficiently old to consult their own ease, constantly lie upon the back with the knees bent and thrown open; this circumstance of pain being produced upon the least motion greatly aids the tendency to inaction in the bowels. There is a most important symptom arising from the extreme pain and tenderness of these organs, viz. a retention of urine, attended with its usual concomitants, tenderness and swelling of the abdomen, and this is so common as to require a vigilant attention, and a vigorous exertion of parental authority, to induce the patient to resort to a voluntary effort.

It has not appeared to me that this disease required any particular time to finish its course, this depending upon the vigour of the patient's constitution, and the original violence of the attack.

From the time that the ulcerative action is completely established, the enlarged labia diminish, and the redness disappears, the ulcer successively extending over parts which had been inflamed. The character of the disease at this time is that of a deep, foul, and spreading ulcer, upon parts weakened by a peculiar inflammation, and a constitution injured and weakened by previous febrile symptoms. The external organs of generation are now progressively destroyed; the peculiar pallor of the countenance increases; the pulse becomes quick and weak; the appetite fails; the bowels become loose; the skin of the thighs hangs loose and flabby as in marasmus; the discharge from the parts increases and becomes more and more offensive, till the patient is worn out and expires.

But if this disease is early seen, and checked by the proper use of applications and remedies, the ulcerations clean and heal, but never without leaving the constitution debilitated and injured. After the sores are healed, there continues a copious yellow mucous discharge from the vagina and external organs, which hinders the patient from recovering strength, and keeps up a tendency to the recurrence of the disease, which I have twice seen, and which in one case proved fatal.

The duration of this affection is various: in one case the patient got better in 23 days, in a second she recovered in 17 days; it is to be understood

that we speak here of the original disease; the mucous discharge, unusual paleness, and general debility, continuing six or eight weeks, but these are only to be looked upon as the consequences of the original affection. It is not possible to say what may be the duration of a fatal disease, this depending on so many circumstances of violence, constitution, &c. which must necessarily influence the rapidity of the termination. Where the ulceration is deep and extensive I have never seen the patient recover. I have never seen the affection terminate in mortification but once, and in this case, which proved fatal I was a spectator of the treatment, which consisted in the application of powerful stimulants to the parts affected. This treatment undoubtedly originated in an incorrect view of the disease, and under this plan the external organs tumefied largely, and the supervention of mortification soon completed its course.

The similarity of this affection to some of the more violent cases of intertrigo, or galling, is very evident in its commencement, bnt the intertrigo, when found near the organs of generation, commences in the deep space betwixt the labia and thigh: whereas the affection here spoken of, uniformly commences on the anterior part of the labia, and extends internally over the parts contained within the fissura magna; after the secretion begins to be copious, the adjacent parts to which the matter is applied, assume the same actions, as the

perineum, anus, top of the thigh. It is probable that Armstrong had seen some cases similar to the subjects of this paper, as may be gathered from his Essay on the Diseases of Children.

If any similarity can be traced betwixt the subject of this paper and any other described disease, I presume it is the erysipelas infantilis, but even here there are so many points of difference, that the identity of the two diseases can by no means be allowed. Dr. Underwood, whom I shall here quote, states that the erysipelas infantilis ordinarily attacks within "a few days after birth: it was remarked (says he) in the former edition, that it was thought never to appear later than the month; but I have since seen it in a child of two months old." The affection which is my present subject, I have never seen under one year old, but frequently from one year up to six years of age; the patients who recovered were five years and a half, and six years of age, and I shall presently quote another four years old. Dr. Underwood states that the milder species forms matter in a very short time. The formation of matter never takes place in the disease I describe, the inflammation runs early into ulceration, but never suppurates, matter only appears as the secretion from the ulcerated surface. Again Dr. Underwood states that the more violent kind very often mortifies, whereas the disease I speak of rarely runs into mortification unless improperly treated, as in the case before attended to; and it may be

well here to observe, that the chief stimulant used in the case as an application, was the ol. camphoræ, which increased all the symptoms, whereas Dr. Garthshore found "linen compresses wrung out of camphorated spirit, successful in checking the inflammation" in the erysipelas infantilis.

These may be thought sufficient points of distinction, but more will be found if we refer to the dissections of the two diseases. In the erysipelas infantilis "upon examining several bodies, after death, the contents of the belly have been frequently found glued together, and their surfaces covered with inflammatory exudation;" "in males the tunicæ vaginales have been sometimes found filled with matter, which has evidently made its way from the cavity of the abdomen;" "in females the labia pudendi are affected in like manner, the pus having forced a passage through the abdominal rings." Now in a case which I shall hereafter quote, the body having been inspected, "the abdominal and thoracic viscera were found to have been free from disease." The erysipelas infantilis attacks equally male and female infants, whereas the disease here spoken of attacks female children alone. I presume that the circumstances above stated will be sufficient to shew that these diseases are distinct from each other; indeed, so far is any inflammatory affection of the contents of the abdomen from accompanying this disease, that the patient evidently sinks under the debilitating influence of a deep

and spreading ulceration; and the organs of generation never exhibit any collection of matter, either as originally formed in their substance, or as the consequence of suppuration in the cavity of the belly. From all these considerations, it is not unreasonable to conclude the disease to be of a distinct and specific nature; its progress, its early termination in such deep and extensive ulcerations, the peculiar whiteness of the face which I have never seen absent, its being confined in its commencement to the organs of generation, and being preceded by its specific fever, all tend to confirm the opinion. Like to all other inflammations, which end in the early destruction of parts, this is attended with fever of a low kind; the pulse which early in the disease is frequent and weak; the clay-coloured tongue, torpid bowel, and vitiated biliary secretions; the dull headache, languor and lassitude shew this; the purple hue of the inflamed parts, and their early ulceration, with an aggravation of the symptoms, compel us to consider it as a disease of debility, and necessarily lead to the plan of cure.

In this disease, the first part of the treatment is to move the sluggish bowels, for which purpose a sufficient dose of the submurias hydrarg. with pulv. rhei, will answer best, and uniformly bring away dark-coloured and offensive stools. The affected parts should be frequently washed with the liquor plumbi acetatis dilutus, slightly aired, and poultices

made with the same liquor, and soft bread, applied warm immediately after the parts have been washed. The intention of these means is to sooth and diminish the inflammation, and they should be persisted in during the inflammatory action, and till the progress of the ulceration is checked, and even longer if tenderness, excoriations, or aphthæ, should affect the perineum, or anus.

It will be necessary to commence the use of bark in decoction, as soon as the ulcerative action is commenced; I have commonly added the confectio aromatica with tinct. calumbæ, and small doses of tinct. opii: during the use of these means, the bowels should be opened every second or third day; and a moderate use of red wine may be allowed.

In the latter part of the disease, when the tumefaction and redness are diminished, and the ulcerations stationary, I have found the ung. oxidi plumbi albi very useful.

When the bowels become loose, which they do in the latter stages, the elect. mimosæ catechu is of excellent service, as a warm and powerful astringent, increasing at the same time the dose of tinct. opii. When the bowels would bear the use of the bark in substance, I have often given it, and have often seen the plan render a spreading ulcer stationary, and protract the fatal termination, where

the constitution had received an injury it was unable to repair.

There is one point of view in which a consideration of this disease is highly important. The instances in which parents, on behalf of children, bring forward individuals upon the charge of rape, are disgustingly frequent; and it can scarcely be doubted, that this disease has been frequently considered in court as evidence of violence and venereal infection; inflammation, ulceration and discharge having always had particular attention in a consideration of the evidence. That very erroneous conclusions may be drawn from a superficial inquiry into these symptoms, will be evident from the preceding observations. I subjoin the following case, which has not hitherto attracted sufficient attention, both as an illustration of this point, and an additional evidence of the existence of this singular affection.

"Jane Hampson *, aged four, was admitted an out-patient of the (Manchester) Infirmary, Feb. 11, 1791. The female organs were highly inflamed, sore and painful; and it was stated by the mother, that the child was as well as usual till the preceding day, when she complained of pain in making water. This induced the mother to examine the

* See Medical Ethics, by Dr. Percival. Note by Mr. Ward, of Manchester, page 231.

parts affected, when she was surprised to find the appearances above described. The child had slept two or three nights in the same bed with a boy fourteen years old; and had complained that morning of having been hurt by him in the night.

"Leeches, and other external applications, together with appropriate internal remedies, were prescribed; but the debility increased, and on the 20th of February the child died. The coroner's inquest was taken, previously to which the body was inspected, and the abdominal and thoracic viscera were found to have been free from disease. The circumstances above related having been proved to the satisfaction of the jury, and being corroborated by the opinion I gave, that the child's death was occasioned by external violence, a verdict of murder was returned against the boy with whom she had slept. A warrant was therefore issued against the boy, but he had absconded, a circumstance which was considered as a confirmation of his guilt, when added to the circumstantial evidence alleged against him.

"Not many weeks however had elapsed, before similar cases occurred, in which there was no reason to suspect that external violence had been offered; and some in which it was absolutely certain, that no such injury could have taken place. A few of the patients died, though from the novelty and fatal tendency of the disease, more than

common attention was paid to them. I was then convinced I had been mistaken in attributing Jane Hampson's death to external violence; and I informed the coroner of the reasons which produced this change of opinion. The testimony I gave was designedly made public, and the friends of the boy hearing of it, prevailed upon him to surrender himself.

"When he was called to the bar at Lancaster, the judge informed the jury that the evidence adduced was not sufficient to convict him; that it would give rise to much indelicate discussion, if they proceeded on the trial; and that he hoped, therefore, they would acquit him without calling any witnesses. With this request the jury immediately complied."

CASE I.

On Jan. 22, 1815, I was desired to see Miss R. aged six years: she had complained three or four days of headache; had been chilly, and occasionally hot; she had been sickly, and taken little food; was dull, heavy, and languid. This morning she had complained of pain in making water: upon examination the pudendum was found inflamed; upon which I was called in.

The inner surface of the left labium was ulcer-

ated, as well as the clitoris; the right labium was inflamed, and the whole parts tumefied, of a dark purple hue, not unlike some kinds of erysipelas; the mons Veneris was enlarged and inflamed; the perineum was inflamed and covered with aphthæ, which also encircled the anus, the discharge was thin, copious and offensive, and had inflamed the top of the thigh, where it had been suffered to remain. The face had a peculiar paleness; the bowels were slow; the pulse quick and weak; the appetite diminished; the tongue of a dull clay colour. She was thirsty, complained of chilliness, and was indisposed for motion. The liquor plumbi acetatis dilutus was ordered as a lotion, to be applied lukewarm; and poultices made up with the same fluid were directed. A decoction of bark was also given with confectio cardiaca.

By the use of these means, the enlargement of the parts gradually subsided, the foul bottom of the sores became red, after which the ointment of white lead was used, and the parts healed by the 14th of February, a space of seventeen days from the first attendance.

In this case the affection again returned, but was early cured by resorting to the same remedies. The patient frequently retained the urine twenty-four hours, the pain was so violent, and obstinately resisted every inclination to empty the bowels, so

that the opening remedies were obliged to be exhibited with a regular attention.

CASE II.

On the 25th of April, 1815, I saw Miss S. aged five years and a half. She had been unwell a few days previous to the 21st, when complaining of pain in voiding the urine, the parts were examined and found slightly red; they were washed with milk and water, and dusted with the lapis calaminaris. On the 22nd the inflammation had increased, and the parts were slightly excoriated. On the 23rd a thick yellow discharge was observed, the patient was getting more unwell, the bowels were slow. On the 24th the open surfaces were enlarging, and small watery vesicles appeared upon the labia and perineum; upon the left thigh also was a large cluster; the bowels were twice opened this day by some family purgative.

On the 25th I saw the patient, and found both labia enlarged, and of a purple redness, with numerous small watery vesicles, upon the external surface, and also within the fissura magna. They were similar to cowpock vesicles of the third and fourth day; were found also upon the perineum, and the top of the left thigh. In some places the tops of the vesi-

cations were loosened, and shewed beneath a deep foul ulcer, particularly in the cluster upon the thigh, and on the anterior part of the labia. The parts within the fissura magna were every where red and inflamed, and several small ulcers were found. The skin around the anus was painful and red; and the secretion was then copious and offensive. There was a dull headache, a quick and irritable pulse, a moist tongue, but bearing a clay-coloured deposit; the motions on the 24th were dark-coloured and offensive; the patient was considerably weakened, and the face of a peculiar paleness. I advised saturnine lotions slightly warmed, and saturnine poultices without oil, to the parts, and gave small doses of pulv. rhei in a saline mixture every three hours.

April 26. Fresh vesications still appearing; and when the tops of the earlier vesicles had come away, the parts beneath were deeply ulcerated. Several aphthæ were observed within the labia, upon the perineum, and around the anus. The skin was hot and dry; the bowels open, and motions dark and offensive; with excessive pain upon voiding the urine.

27. The top is thrown off from the cluster of vesicles upon the thigh, as well as from the vesications upon the pudendum and perineum; the open surfaces are deep and foul, secreting largely a thin

and offensive matter; the anus surrounded with aphthæ; the pulse 120; skin hot and dry; bowels open, and urine excessively hot and painful. Ordered a decoction of bark, with the conf. cardiaca; recommended a little red wine to the patient, and to continue the applications to the parts.

28. The bowels slow; the urine has been retained thirty hours; the abdomen tender and hard; with much difficulty she was prevailed upon to void the urine, which was copious, high-coloured, and of a strong smell: the aphthæ had almost disappeared, and the diseased parts shewed a large ulcer of various depths, extending over the pudendum and perineum, down to the anus; the parts within the labia were in the same state, and a deep ulcer, but not extensive, lay upon the left thigh, on its upper and inner part; the secretion is thin, copious, and offensive. The sores were ordered to be washed with the lotion as usual, and dressed with the white lead ointment. Continue the bark mixture, and increase the wine.

29th and 30th. The ulcerations were stationary; the same means were continued; but as the bowels were slow, they were moved with an infusion of senna.

May 1. Sores improving; the bottom becoming

less foul, and discharge less offensive; pulse 90 and weak; appetite poor; sits up a little; great inclination to retain the urine; bowels open. Continue the applications and remedies.

2nd. The sores improving, as well as the strength. This state of improvement continued regularly, till the sores were healed on the 14th. After the healing, the pudendum continued discoloured and tender, and a considerable yellow mucous discharge continued with varying quantity for the space of six or eight weeks; this was relieved by a continued use of the tinct. lyttæ, bathing the parts frequently in the day with a solution of the sulphas zinci; the shower-bath was also used with the intention of checking the secretion, as well as getting up the strength. I saw this patient on the 27th of June, when the discharge had ceased.

Upon looking over my notes, I find that, in nine years, I have seen twelve cases; of these, I have only seen the two above related so early as to be materially serviceable; the others being among the children of labourers, had little chance, either from the attention or punctuality of the parents, of getting over so very formidable a disease. One, a little girl of two years old, recovered, and was attacked again in the course of a fortnight, which second attack proved fatal. In a

girl, five years of age, where the earlier appearances of the disease had been entirely overlooked, the mother upon finding an extensive ulcer, brought the child to me, under the idea of its having received injury from fire, which had escaped attention. The case proved fatal.

CASE
OF
UN-UNITED FRACTURE
OF THE
OS HUMERI,
TREATED SUCCESSFULLY BY THE SETON.

By JOSIAS STANSFIELD, Esq.
SURGEON TO THE LEEDS INFIRMARY.

COMMUNICATED BY
MR. BRODIE.

Read Jan. 9, 1816.

WILLIAM FISHER, aged 48, a strong healthy man, was thrown from a stage-coach on the 4th of December, 1814, and fractured his left arm. He was immediately taken to a neighbouring surgeon, who adjusted the fracture, and applied a roller and splints; these were removed at the end of four or five weeks, when it was discovered that no union whatever had taken place. Frictions were then employed, and the parts bathed daily with hot water, but without producing any beneficial effect, and the patient's arm continued in a useless state to July 1815, the period of his admission into the Leeds Infirmary. On examination I found very considerable motion at the fractured part, so that

the two portions of bone could be made to form a very considerable angle; he was also unable to raise the arm from the side. The fracture was very oblique, the extent of fractured surface being, as nearly as I could ascertain, four inches; commencing near the insertion of the deltoid muscle, and terminating within two or three inches of the elbow joint. Both arms were equal in length. By pressing deeply between the biceps muscle and the bone, I could feel the sulcus of the fracture, and it was indistinctly perceptible on the outer side. The nature of this injury being favourable for the passage of a seton between the fractured ends, as recommended by Dr. Physic of America, I determined to try this mode of treatment; and accordingly on the 28th of July, I commenced the operation, by making a division of the integuments, an inch and a half long, on either side of the bone, about the centre of the fracture; the biceps muscle was then drawn inwards, and the cellular membrane divided, down to the sulcus; on the outer side I was obliged to divide some fibres of the triceps muscle; a curved seton needle was now easily pushed betwixt the ends, the intervening substance being very soft. The seton string consisted of a skein of silk, doubled, and well waxed. The lips of the wounds were drawn together by strips of adhesive plaister, and a compress and bandage applied. On the following day, the patient was in very great pain, and had a smart attack of fever, which induced me to take off the dressings, and apply a

bread poultice, adopting at the same time the antiphlogistic regimen. This plan was continued till the inflammation had subsided, and suppuration was completely established. During the first fortnight, the slightest motion of the arm gave him very acute pain; but by the 16th of August being comparatively easy, I dressed the wounds with ointment and lint, and applied a compress and splints, supporting the whole by two leather straps; his arm was allowed to hang by his side, by which it was kept straight, and this position was the easiest to him.

He was now ordered to get up daily, and walk out in the open air as much as he could bear to do without fatigue; to have as much meat and porter as agreed with him, and to take the decoction of bark with dilute vitriolic acid. From this period the wounds were dressed daily, and the arm kept as clean as possible, which prevented the accession of any inflammation of the skin. The seton string was moved backwards and forwards several times at each dressing, in order to preserve the effect of the stimulus, which gave the patient considerable pain. By the 26th of August, the arm had gained some strength, as it could be raised a little from his side without giving way. On the 8th of September, a seton string of half the size was passed, from which time he experienced no uneasiness. September 18th, the arm could be raised to a horizontal position without bending, and he could himself raise it very considerably. By the 30th of September no

motion whatever was perceptible at the fractured part, but as he remained easy, the seton string was not withdrawn till the 3rd of October. The wounds soon after healed, and he was directed to wear a bandage round his arm for some weeks, also to rub it extremely well, and use it freely. I saw him again on the 3rd of November, when he could carry his hand to the back of his head, his arm feeling as strong and useful as before the accident.

Leeds, 20th December, 1815.

HISTORY

OF

A CASE

OF

WOUND IN THE FACE,

REQUIRING THE OPERATION

OF

TYING THE COMMON CAROTID ARTERY,

WHICH WAS PERFORMED WITH SUCCESS.

By CHARLES COLLIER, Esq.

SURGEON TO THE FORCES.

COMMUNICATED BY

SIR JAMES MACGRIGOR.

Read Dec. 26, 1815.

WILLIAM BALL, drummer, belonging to the 44th regiment, aged between nineteen and twenty, of a spare habit, was wounded by a spear or sword, on the 17th of June, which passed in at the angle of the left jaw, and penetrated the mouth, lacerating the tongue severely, in three or four places. He was brought into St. Elizabeth's Hospital on the 19th, and had, by his account, lost a considerable quantity of blood on the way; but from this time, until the 22nd, nothing remarkable occurred. On the evening of the 22nd I was sent for to see him, and I found arterial blood jetting up with considerable force from the bottom of a narrow,

deep wound, and flowing in directions as if from several branches of the external carotid. I attempted dilatation; but all efforts to trace the sources of bleeding were fruitless, and I applied steadily and forcibly graduated compresses, moderating the flow of blood, by pressure on the carotid. Although the hæmorrhage yielded for three or four minutes, it was soon evident it had only changed its channel, for it began to flow as furiously through the mouth as it had before done through the wound, and the coagula required constantly removing to prevent suffocation.

The patient's countenance had now become pale; the pulse was hurried and feeble; every appearance indicated the rapid sinking of life from the loss of blood, and my opinion that the patient's preservation depended on securing the common carotid artery, being sanctioned by a consultation which I held with Mr. Cavanagh, surgeon, royal staff corps, and my friend Mr. S. Cooper, staff surgeon, I performed the operation, in presence of these gentlemen, at eight o'clock that evening.

The patient being laid on a table, and his neck a little on the stretch, I made an incision of rather better than two inches, on the inner and lower surface of the sternal portion of the sterno cleido, mastoideus dissected off the platysma and cellular substance, and detached from its border the thyroid vein, after having exposed it. The dissected muscle was

held aside by Mr. Cooper, while I detached the jugular vein from surrounding connections, and took off so much of its cellular covering as should leave sufficient indication of its coat;— this difficulty removed, I laid open the sheath of the artery, pushed aside the par vagum, and a little dissection enabled me to pass a blunt probe, armed with a ligature of two threads, round it. The vessel was then secured at about three-fourths of an inch from the sternum, and the wound approximated by two interrupted sutures. The operation occupied nearly an hour; delayed, in some degree, by its being performed by candle-light, and by the necessity we were under of raising the patient up, occasionally, to clear his mouth of coagula;—he lost no blood from the operation;—the hæmorrhage ceased the instant the ligature was fastened.

In two hours after the operation, the patient was quite tranquil, and sensible;—the pulse feeble; countenance very pale;—on the following morning (23rd) I found him perfectly sensible, and easy, with the exception of some sense of heat in the throat, rather increased since the operation;—the pulse was 96, with slight sharpness; no appearance of hæmorrhage; the bowels were opened by small doses of calomel and jalap. The wound was dressed on the 25th, and looked healthy;—pulse feeble, and varying from 112 to 120. On the 26th he complained of a ringing noise in his left ear, and some sense of numbness on the left side of the face.

From this time until the 2nd of July, nothing occurred which could cause much alarm:—the pulse was seldom below 110; the skin was of its ordinary temperature; the right carotid pulsated with greater force than ordinary; the sensorium was no way disturbed; there did not appear to be any want of blood on the left side of the head. The patient's bowels were kept open by neutral salts, and his diet was of the lightest kind. On the 2nd of July, slight erysipelas commenced over the parotid gland on the left side, spread over that cheek and eye-lid, causing some tumefaction, and slightly affecting the opposite side.—It was mild,—vesicated in a few places,—and subsided in five or six days under a treatment of mild purgatives, and cooling applications. On the 5th of July the ligature came away from the artery, and the cure appeared to be more progressive, and steadier than could well have been expected from a constitution, shaken by former illnesses. On the 12th of July a second attack of erysipelas commenced, in its scite, and degree, similar to the former, and yielding, like it, to mild treatment.

The wound of the operation soon healed, with the exception of the spot through which the ligature had passed, and this discharged slightly for some few days after it came away; the original wound closed shortly after the operation.

The patient's health being restored, and the

wound quite healed, he was discharged from the hospital on the 12th of August.

No pulsation could at that time be perceived on any part of the course of the artery, above the ligature.

The sleep was good, but I am not aware that it was longer, or deeper than ordinary.

HISTORY

OF

A TUMOR

SUCCESSFULLY REMOVED

FROM THE

FACE AND NECK,

BY PREVIOUSLY

TYING THE CAROTID ARTERY.

By WILLIAM GOODLAD, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, AND SURGEON AT BURY, LANCASHIRE.

COMMUNICATED BY

MR. ABERNETHY.

Read Feb. 6, 1816.

THE carotid arteries furnish so large a portion of the blood transmitted to the brain, that practitioners have been till very lately deterred from securing them by ligature, lest the functions of that important organ should be so much impaired as to destroy life. Mr. Abernethy was the first who tied the left carotid, which he did in a man who had the internal, and many branches of the external artery, divided by the horn of a cow. The patient lived only thirty hours, and died from the functions of the brain being injured.

This operation was, therefore, so little encouraging, as to be justifiable only where death must otherwise be inevitable; since that period, the carotid has been tied by Mr. A. Cooper, and by Mr. Travers; but I believe there is no instance on record, of its being secured by ligature, in order to render the removal of a tumor practicable; the following instance of its successful adoption will therefore, I hope, be worthy the acceptance of the Society.

On Thursday, August 31st, I was desired to visit Mrs. Kershaw, of Middleton, a thin, middle-aged woman, upon whose case a consultation had been held the preceding day, at Manchester; the general result of which was, that no operation was advisable. She had a large tumor extending from near the external canthus of the left eye, down the cheek to the infra-orbitary foramen and the root of the ear, which was elevated by the tumor, and, passing under it, it extended behind the mastoid process. Anteriorly, it extended to the chin, and to the trachea, which it partially covered, and hung pendulous over the clavicle. The circumference of the base of the tumor, when last measured, was twenty inches, since which period it had increased rapidly, but I regret not having ascertained its exact size; it must, however, from the space it occupied, have been at least twenty-eight inches.

In the upper portion, comprized between the

cornu of the os hyoides upwards to above the zygoma; the tumor in the base was as large as, or larger than in its middle or apex, but below this point, its attachment to the neck was less extensive; and though hanging pendulous over the clavicle, its lowest connection with the neck, was three quarters of an inch distant from that bone. On elevating the tumor in this lower space with a hand on each side, and passing the fingers at the same time under it, it might clearly be ascertained that there was no connection with the vessels; but as it hung over the trachea, and was connected with it, it required a very careful examination to be convinced that they were not united. The cornu of the os hyoides was however moveable under the tumor, and independent of it; respiration was tolerably free, when in an erect posture, and on passing the fingers forcibly between these parts, I was pretty well convinced that they might be separated. The œsophagus here was too deep to be implicated in the disease.

Above the cornu of the hyoid bone, the base of the tumor was very extensive, and deep, impeding deglutition considerably. On directing the finger, passed into the mouth, towards the base of the ramus and angle of the maxillary bone, and into the fauces; the intervening substance appeared considerable, and authorized an opinion that the fauces would not be cut into, nor indeed exposed, by its removal. The submaxillary gland was press-

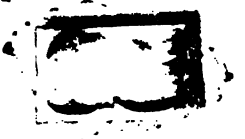
ed inwards, but did not appear enlarged or hardened, and the membrane of the cheek was also healthy, though the tumor appeared in contact with it.

The disease commenced behind the angle of the jaw, and now extended beyond the mastoid process, and was so closely connected with the subjacent parts, that the finger could not be passed under it. Its connections here, therefore, were only to be ascertained by collateral circumstances; and as the whole site of the parotid gland was covered by it, it became a question worthy of serious consideration, how far that substance was enveloped in the disease, particularly as it had been stated on most respectable authority, that its removal was impracticable. The patient's being able to open the mouth and masticate, was a complete proof, that if the whole substance of the gland were diseased, it had become dragged from its situation by the weight of the tumor, and that the tumor itself did not dip into the fossa behind it. Yet every other circumstance rendered it certain that the parotid gland was enveloped in the disease, which was indeed verified in the operation. But the extent of the disease here became of less importance if the carotid artery were previously secured, as I intended. I ought to have observed, that the tumor was perfectly moveable, though its motions were very limited, and that it had,

therefore, no bony attachment either to the jaw or to the zygoma.

The surface of the tumor was divided into large tubercula, and the apex of each tubercle was rendered more prominent by a collection of fluid: it was fleshy, but had neither the hardness nor any other external character of carcinoma. There was no absorbent gland affected in its neighbourhood, and though ulcerated in two points, one of which was extensive, the aspect of the ulcer was not forbidding, being partially granulating and partly sloughing. Fungus hæmatodes was therefore not to be dreaded. Yet a discouraging circumstance arose from a Charlatan's having, as he believed, succeeded in removing the complaint by the knife, at an early period of its history, on which occasion the hæmorrhage was very alarming. After a short time, the disease reappeared, and had only been nine months in attaining its present enormous size. Large varicose veins spread over the surface, and as the skin was uniformly diseased, ulceration might be expected to extend to them, and hæmorrhage to be an inevitable consequence.

The woman's health was tolerable, though her strength was reduced; and the weight of the tumor, which she generally rested on the shoulder, prevented her from using exercise. She had applied to many practitioners, and to a neighbouring infirm-



ary; but the result had uniformly been unfavourable to her wishes. The consultation which I have mentioned, was called by my friend Mr. Killer, to whom, at the recommendation of a practitioner in the neighbourhood, she had applied as a last resource, and nothing discouraged at the result of it, she was resolutely determined to have the tumor removed, if any one would second her noble resolution by making the attempt.

The objections to the operation were twofold, and depended on the hæmorrhage threatening immediately to destroy the patient; or, this being removed, on the disease being reproduced. The former objection was obviated by tying the carotid artery, and there was no doubt of the disease being removable except at the part I have mentioned; and as it was agreed by all the consultants that her death was otherwise inevitable, and must soon take place, there appeared at least a chance of her being saved, and however small that chance, I considered a surgeon justifiable in seizing it. The question then turned on the propriety of tying the carotid artery. I had a firm conviction that in both Mr. A. Cooper's cases the patient died *; and this conviction was so strong that I did not refer to them. But though this had been the fact, no surgeon would hesitate in cases of aneurism, to give his patient the small chance of recovery which an operation offered, after the encouragement, which the

* One of these patients recovered.

insulated instance, as I believed, of success in Mr. Travers's case, afforded, rather than suffer him to die inevitably by the progress of the disease; and if we consider the causes of death, it will appear that none of these causes would be enhanced by the peculiarities of the present case, and the additional operation. The chance of irritation in the trachea, œsophagus, &c. producing cough, and destroying adhesion in the vessel, or in the par vagum, disordering the stomach, was equal in either case, but the danger most to be apprehended from hæmorrhage was less considerable than in aneurism, from the artery being almost certainly healthy. If inflammatory symptoms supervened, they were also likely to be relieved by the discharge of a large suppurating sore; and the loss of blood during the operation, though considerable, would be in this respect advantageous and desirable.

Another consideration was the power of restoration, for the skin covering the tumor was diseased; a large suppurating surface must therefore be exposed and filled by granulations. It was not certain that sufficient power would remain in the part for these operations, especially as the sources from whence they must proceed, were previously weakened by disease. But having expressed my willingness to encounter these difficulties, the woman was importunate for the attempt; and as an alarming hæmorrhage supervened on the third day after my visit, her life could not be materially shortened, and

no time ought to be lost. I, therefore, with the consent of Mr. Killer, who had obligingly offered me his assistance, appointed Tuesday, September the 5th, to meet my friends at Middleton, for that purpose. I was disappointed in not having Mr. Killer's valuable assistance, but his place was kindly supplied by my ingenious friend Mr. Jordan, of Manchester, who with accurate anatomical knowledge combines great coolness and dexterity; and in the presence of Messrs. Brigham, Woodcock, Morris, Bingham, and several other gentlemen, the operation was performed in the following manner: the patient being previously laid upon a table, with her head as low as she could bear, from the danger of suffocation by the pressure of the tumor.

An incision about four inches in length was made through the integuments, from the points A B*, and the tumor at the same time brought as much as possible from over the trachea, to reach the edge of the sterno-mastoid muscle; the course of which could not previously be traced, the sternal edge of its tendinous insertion being only just perceptible; blood followed the incision very profusely, but having dissected the sac of the tumor from the neighbouring integument, the inner edge of the muscle came into view, and the platisma myoides being more freely divided, the artery was plainly felt beating at the bottom of the wound. The knife

* See Plate I.

was now laid aside, the cellular membrane separated by the fingers, the arterial sheath exposed, and the vessels secured between the finger and thumb: I endeavoured to separate the fibres of the fascia by the nails of the fore-finger and thumb, so as to pass the finger beneath the artery, and by its constant apposition with the vessel, prevent any other part from being included. The resistance to this attempt was great, and the eyed end of a probe which I had formerly found useful, was directed to the outside of the vessel, so as to press against the finger on the opposite side; but though bent at different angles to accommodate it to the wound, the shaft of the strongest probe was too slender to be directed with accuracy to so great a depth, and generally turned in the wound. The size of the tumor very much added to the difficulties of this stage of the operation, not only by rendering the wound deeper, but as it was necessary to keep it aside, and this necessarily impeded the fingers; whilst, if left at liberty, by pressing upon the probe, it changed its direction. The point of an aneurismal needle was next tried with no better success, but on directing the shaft of the needle into the wound, it was pressed against the finger with great facility, and when convinced that no part intervened, for the vessel had been stripped of its fascia, except at its posterior part, where on insinuating it between the thumb and finger, passed on each side, only a few fibres were left undivided, and the division of these being accomplished, the finger was gradually and

cautiously passed under the vessel, with the needle in contact with it, passed from without inwards. But it had to be turned, which in so deep a wound was with difficulty accomplished; and though the greatest care was observed by keeping the finger of the left hand between the end of the instrument and the trachea, and pressing at the extremities of the instrument to bend and accommodate it to the cavity, more violence was done to the vessel than was desirable.

The patient bore this tedious operation with great fortitude, only endeavouring to relieve the irritation which the fingers produced, by a frequent attempt to swallow. A considerable quantity of blood was already lost, and the ligature was therefore immediately tied as low as possible in the wound. She complained of much pain, when the thread was drawn tight, extending from the wound to the whole of that side of the head.

The fluid contained in the apex of each tubercle was next discharged to reduce the size of the tumor, and render it more easily handled, as well as to lessen the pressure on the trachea, of which the patient complained heavily. The incision being then carried along the base of the tumor to its upper part, it was dissected from the cheek; though, during this, and the remaining part of the operation, the fingers were used wherever practicable: but occasionally stronger ligamentous bands ren-

dered division by the knife necessary. The hæmorrhage, on dividing the integument, which connected the upper portion of the tumor to the head, where the external veins were ramified over it, was considerable, and on dissecting downwards the ramus of the jaw became cognizable; and in this part, as well as under and behind the ear, each stroke of the knife was followed by a gush of blood, and occasionally in a tremendous stream, which, after continuing for a few seconds, ceased. The patient was very faint when the operation was finished, but a little wine at intervals soon restored her to complete perception.

Besides a general oozing, there were a few points from which blood flowed rather freely, though the blood was venous; and as a matter of caution rather than of necessity, they were secured by ligature. The wound now exhibited the following appearances: the whole sterno-mastoid muscle was exposed, and its fibres dissected clean, except about half an inch from its insertion into the clavicle. The wound extended backwards from behind the mastoid process, to the trachea anteriorly, but became narrowed in the direction of the muscle at the lower part of the neck. The submaxillary gland was exposed, and about one-fifth of its substance, not appearing healthy, was removed. The digastric and the greater portion of the milo hyoideus were exposed, the ramus of the jaw was only covered by periosteum, except where covered

by the masseter muscle, part of which, not appearing healthy, was dissected away; the whole of the condyloid process of that bone was laid bare in the same manner, and behind it the pterygoid muscles were also exposed. The membrane of the cheek was only covered by a cellular substance, which did not appear healthy; but sufficient skin was saved to cover the zygoma. The parotid gland was entirely removed.

After cleansing the wound, the skin wrapped over as much as possible, was secured by adhesive plaster, covered with a pledget of lint spread with cerate. The patient expressed herself comfortable, though very faint; and the table being brought to the bed-side, she was lifted into it. Her pulse was 110 and very weak.

11 *p. m.* She is very comfortable, except from thirst, and soreness in the throat, which impedes swallowing. Her pulse is risen, though not less frequent. She has made water freely.

Wednesday, 9 *a. m.* (second day.) She was troubled with thirst till midnight, but afterwards slept comfortably; the soreness in the throat is abated, though on swallowing it is perceptible. At four *a. m.* she perspired copiously, and her skin is now moist. Pulse 108 and soft: she has passed urine freely; no discharge from the bowels, but she had three motions yesterday previous to the operation.

There is a copious secretion of tough mucus from the trachea, no headache or sickness, and the wound is easy. A general oozing of blood has stained the dressings.

9 *p. m.* Pulse 120, skin rather hot and dry; occasional pulsation in the head; no thirst. Discharge of bloody serum from the wound continues. To have an opiate if restless; and an enema early in the morning if the bowels have not been opened.

Thursday, 9 *a. m.* (third day.) The patient has had a good night without the opiate, having scarcely awoke. Her pulse is now 106 and soft, no pain in the wound, though the face is somewhat swollen. She had a shivering in the night, which was immediately removed by warm covering, but succeeded by considerable heat.

In addition to the soreness of the throat, she has a trifling cough, which gives no pain. The enema procured three large motions of a good colour and consistence; she makes water freely; and has taken tea and gruel comfortably, but in small quantities.

9 *p. m.* The pulse is again risen to 120 and full. She complains also of some headache, and the throbbing extends down the face; her bowels have not been again moved. She has neither thirst nor heat. The oozing of blood appears to have

ceased, and the soreness in the œsophagus and secretion of mucus are somewhat moderated. Her head and neck have been kept moist with tepid water, and she is directed to take one of the following powders every four hours.

℞. Hydrarg: submuriat: grs. vj.
Pulveris: Antimonial: grs. xvj. M. et divide in chart: vj.

Friday, 9 *a. m.* (fourth day.) I found her with her skin cool and moist, pulse 100 and soft. She passed the night comfortably, the beating in her head is less troublesome, and is perhaps of little consequence, as she is subject to it. The wound discharges copiously, which will relieve any determination to the head. Her bowels have been again opened this morning. She has still tenderness on swallowing, and a considerable flow of mucus; but her cough, which has been very trifling, has left her.

Friday evening, 8 *p. m.* Pulse 104, but possesses a peculiar vibrating feel, her head is easy, she has no heat, little thirst, and is without cough. The mucous secretion does not increase, though the soreness is extended to the root of the tongue. The catamenia, which had begun to flow this morning, have ceased. Her bowels have been again opened. If the headache return, or the soreness in the

throat increase, let an enema be injected. To continue her powders, and to take milk freely.

Saturday, 9 *a. m.* (fifth day.) Pulse 104 and soft; there is neither thirst nor headache complained of; the skin is cool.

The pain on deglutition, and the ptyalism as usual; but the former is complained of chiefly after sleep. The night was passed comfortably.

The dressings were removed, and the following appearances were noted down. The wound is very extensive, and covered in its upper portion with a dark-coloured mucous matter, which adheres to it. There is also some dark-coloured coagulated blood oozing from several points. The lower half of the wound is not at all granulating, but of a palish ash colour, and the skin in some parts of its edge vesicatory. The discharge is considerable and watery.

Dry lint was applied, and the patient was ordered to take wine or porter in small quantities, in addition to her milk and broth.

℞. Decoct: cinchonæ lancif: f. ℥vij.
Tinct: cinch. Comp: f. ℥ss.
Acid: Sulph: dilut: f. ℥j.
Tinct: Opii *m* XL M. Capiat cochl. ij quartâ quâque horâ.

Vespere.—Skin cool, pulse 100. She has taken broth, milk, &c. and a small quantity of wine; but the pulse having risen it has been omitted. The bowels have not been moved since this morning's visit; a purging powder was therefore given, and the bark and wine discontinued till the bowels are opened.

Sunday, 10 *a. m.* (sixth day.) Pulse 98 and soft, the skin cool, no headache or thirst, and the difficulty in swallowing abated. About three o'clock she awoke from a dream, and was much agitated; her pulse was then very quick, and the throbbing in the head very violent, with acute pain; but in half an hour she again slept, and passed the remainder of the night comfortably. There is some sensation in the cheek, and the warmth has been always natural. Her bowels have not been opened.

The upper surface of the wound is sloughy, the lower part granulating, but the granulations are very pale. A slough also lines the orifice, which passes to the artery.

Monday, 10 *a. m.* (seventh day.) The patient has passed a good night, the pulse is 100 and soft, and she is free from thirst or fever. Her appetite is good, and she takes plentifully of milk, pottage, and broth. A motion was yesterday procured by an enema, she had another this morning. The secretion of mucus and the pain on swallowing are

abated. There is some deficiency of saliva, the mouth being generally dry after sleeping. The discharge is partly puriform, but there is a very copious flow of saliva from the submaxillary gland. The slough is thinner, having here and there points of granulation rising through it, in one place the size of a sixpence. In the neck the granulations are pale, but there is a disposition to cicatrize on the posterior edge, where the mastoid muscle passes. The pulsation in the right carotid extends to the left side, and that of the left subclavian seems to be communicated to the vessel which has been tied, and excites suspicions of its being still pervious.

Tuesday, 9 *a. m.* (eighth day.) The sloughs continue to separate, and the granulating surface is less pale. The discharge is copious, and from the neck puriform. There is also some discharge from the orifice through which the ligature passes to the artery, but it is very healthy, and the slough lining it has separated. The last ligature on the small vessels also came away this morning. The patient passed a good night, and her strength increases.

Wednesday. She was restless till one *a. m.* but her bowels were then moved, and she afterwards slept comfortably, yet is not so well this morning. Her pulse 110 and irritable. Her appetite fails, having a dislike to any thing but gruel; yet her

tongue is clean, her skin moist, her bowels have been again opened, and the discharge is natural. She had yesterday some throbbing near the ligature, but to-day the wound is easy. The ulcer on the neck contracts rapidly, the granulations, though pale, being healthy; but in the upper part, covering the cheek, the surface is glassy and irritable, with streaks of vessels running over it. The sloughs are mostly separated, except one, the size of a shilling, below the ear; and another in the deepest part of the wound, at the lower edge of the submaxillary gland. The flow of saliva from this part is very great; below it, the discharge is healthy, but upon the cheek glutinous. A very little healthy looking pus may be pressed out of the orifice through which the ligature passes, but the granulations are rapidly closing around it, and it is now a mere fistulous opening. Dry lint was applied to absorb the moisture, and over it adhesive plasters.

I visited her again this evening, and found her pulse 104 and softer. The perspirations have been considerable, and the bowels again moved naturally. She was directed to eat ripe fruit, and omit the wine.

Thursday (the tenth day). The following report was collected at this morning's visit. The patient passed a good night,—her appetite is returned, and her pulse early this morning 94. The wound looks

much better, and contracts rapidly; the upper portion beginning to heal, particularly near the ear.

Friday. Much as yesterday, in all respects going on well. The pulse 102. She has been allowed to sit up, the last three days takes food well, her bowels regular and the discharge puriform. The ligature has risen considerably out of the wound.

Saturday (eleventh day). The ligature came away this morning, without the smallest hæmorrhage; her pulse is 92 and soft. She slept well after midnight; her appetite is excellent, bowels regular, and the wound healing rapidly.

Sunday (twelfth day). Much as yesterday, pulse 92. She sat up an hour yesterday without fatigue, and slept well.

Tuesday (fourteenth day). The pulse yesterday morning, in consequence of being agitated, 108 and irregular; to-day it is only 82, soft and regular. The patient improves progressively, but the granulations rise above the surface, and there has been a large secretion of saliva: the surface was therefore occasionally washed with a solution of the nitrate of silver, which has repressed both these inconveniences. The wound leading to the artery is entirely filled up. The general health is good,

and on the seventeenth day after the operation, she sat up three hours without fatigue.

It is unnecessary to occupy the time of the Society by a further detail of her advancement towards a complete recovery. In ten weeks the wound was healed; but the granulations were never florid or pointed, and the secretion of saliva was long considerable, though it did not appear to retard the cicatrization of the ulcer. There has been no symptom of a return of this formidable tumor.

I cannot close my account without calling the attention of the Society to the improvement which this branch of surgery is likely to derive from this operation, for the extirpation of any tumor behind the jaw, which is not connected deeper than the muscles attached to the styloid process, may with safety be removed by it, and very few instances of disease here have a deeper origin. The surgeon cannot however be too cautious, that neither the larynx nor pharynx are attached to it.

I know of no case, where the disease was at all comparable in extent, with a similar result. The rapidity of the growth of the tumor shews its extreme vascularity, and the flow of blood was so considerable, even with the carotid tied, as to convince me, if the subject had previously admitted of a

doubt, that the most dextrous operator could not have completed it, without that preparatory step *. It was not merely the security which was thus afforded to the operator, but the chance of the tumor being reproduced was also lessened; for if any portion of the diseased structure escaped observation, by cutting off so directly the flow of blood, there was great reason to conclude it would die from mere exposure. I hailed the sloughing surface, therefore, as a favourable circumstance, whilst it did not extend too deep; for there could be no hesitation in attributing it to the right cause, as the constitutional symptoms were mild. The vesicatory tendency in the skin along the edges of the wound, though partial, in all likelihood depended on some portion being left to cover the wound, which had been previously weakened by disease, and shews that the parts must be healthy to recover from so direct a privation. The sphacelation of the skin over aneurismal tumors, after the operation, is no doubt owing to the same cause.

A question would arise from this view, as to the propriety of merely performing the preparatory

* In a similar case, especially if the tumor were well defined, the operation would be much simplified, if, instead of tying the artery, the surgeon were to cut down upon, and command the current of blood through it, by an assistant pressing it either upon the vertebræ, or between his finger and thumb, until the tumor were removed, and the divided branches secured.

operation, and leaving the diseased mass to slough away. But it appears to me unadviseable, since the sloughing of so large a substance would produce more constitutional derangement than its removal by the knife, and retard, if it would not prevent, the adhesion of the arterial coats.

I do not dwell on the additional confidence which is now afforded, in tying the principal blood-vessels, where there has been no obstruction to the circulation; for though a point of much practical importance, there is already a thorough conviction of its necessity and propriety; and for this conviction we are indebted to Mr. Abernethy, and other surgeons of the present day.

But these operations, always delicate, may be much facilitated by improvement in the instruments with which they are performed. The great variety used, shews that none of them are well calculated for accomplishing the principal objects of the operation. For if strong enough to be directed and passed under the vessel, the instrument has to be turned in the wound, and the property which rendered it valuable in the first stage of the operation, becomes now a great disadvantage. I am happy to present an instrument invented by Mr. Jordan, possessing both these properties, by a contrivance which displays great ingenuity. The following is

an extract from Mr. Jordan's letter, explanatory of it; which with a needle on his principle, I beg leave to submit to this Society.

"When an aneurismal needle is passed under an artery and turned in the wound, the length of the needle is the diameter of a circle, a segment of which must be formed, or the parts forced from their natural position; and although the diameter may be diminished by increasing the curve of the instrument, to do this with the common aneurismal needle, requires more force than it is desirable to use. When the instrument is passed under the vessel, its shaft is worse than useless, but, if we could convert the shaft into an elastic substance, its flexibility would render the turning of the instrument easy: with this view I have formed the inclosed needle.

"Cut off about five-sixths of the shaft of a common aneurismal needle, and to the curved portion, join a piece of elastic steel of a convenient length, in the upper part of which is an eye for the passage of the ligature. To give this the necessary firmness, I have a small silver sheath, which slides upon the steel and covers it, except at the superior part where the eye is formed. This sheath opens laterally, and may be taken off when the firmness of the needle is no longer necessary."

For the accompanying drawing *, which represents the characters of the tumor more correctly than any description, I am indebted to my friend Mr. Brigham, of Manchester, who favoured me with his attendance at the operation, and took the sketch previous to its performance.

* See Plate I.

HISTORY

OF

A CASE OF ANEURISM

OF THE

FEMORAL ARTERY,

FOR WHICH THE OPERATION

OF

TYING THE EXTERNAL ILIAC ARTERY

WAS PERFORMED.

By CHARLES COLLIER, Esq.

SURGEON TO THE FORCES.

COMMUNICATED BY

SIR JAMES MACGRIGOR.

Read Feb. 6, 1816.

JOHN MORRISY, of the second battalion of the 30th regiment, aged 24, of a full and masculine habit, was admitted into St. Elizabeth's Hospital, under my care, Thursday, August 24, for aneurism of the femoral artery of the right side; the tumor was about three inches in length, and two in breadth, and extended to within an inch of Poupart's ligament. The pulsation was powerful, and gave the feeling of a strong thrill, with considerable resistance to the propulsion of the blood; there

was a cicatrix where a ball had entered, on the top, about two and a half, or three inches from Poupart's ligament; the skin was not discoloured; the limb was of the same temperature and plumpness as the other.

I learned that the patient had been wounded by a musket ball on the 18th of June, which had penetrated at the cicatrix alluded to, and had remained in the limb; that he had lost a considerable quantity of blood at the time, but that nothing particular occurred during the healing, and he had been discharged the hospital, apparently cured, on the 12th of July. On the 17th of July he was placed as orderly in the Notre Dame Hospital, where he continued, being at times very dissipated, until the 18th of August, when, being unable to go on with his duties, he, for the first time, shewed the tumor to the medical officer in charge, and was instantly taken under treatment.

This hospital being broken up, was the cause of the patient coming under my care on the day stated.

The aneurism I considered to have been formed by the injury done to the vessel, in the passage of the ball, and to have been consequently of two months' duration; the constitution was vigorous and good, and fearing lest the pulsation or any loss of health might occasion the cicatrix to ulcerate, I

determined not to delay securing the external iliac artery, an operation which I judged to be requisite in order to save life, and to be urgently called for, from the visible enlargement of the tumor. He was confined to bed, kept on spare diet, and the bowels were evacuated preparatory to the operation, which I performed on Monday, August 28, at twelve, in presence of Mr. Gunning, surgeon in chief, Mr. Neil, deputy inspector, Dr. Wray, physician to the forces, and most of the medical officers at Brussels.

I made a semicircular incision, which began three-fourths of an inch on the interior of the inner ring, had its base on Poupart's ligament, and terminated at about one inch and a half from the anterior superior spinous process of the ilium, horizontally with the commencement. The fascia of the external oblique, after being exposed, was detached from Poupart's ligament, to the same extent, and in the same direction; on turning it up, the lower edge of the internal oblique, and the beginning of the cremaster muscles, with the spermatic cord passing through the inner ring, were distinctly seen. Some fibres of the internal oblique, having their origin from the ligament, were then divided in order to give me room. The cord was held aside with the flap formed by the incision, while I enlarged the inner ring with the handle of the knife, and detached the peritoneum with my finger, so as to enable me to feel the artery, which I found

covered by, and closely connected to some small glands, the largest of which I removed. Having separated the artery, I passed a director under it, and the gentlemen present being satisfied that it alone was raised, I passed a probe, armed with a ligature, along the groove, and secured it: the pulsation in the aneurismal tumor instantly ceased. The edges of the wound were approximated by one suture. Two small arteries sprang during the operation, but there was no blood lost deserving the least consideration.

In one hour after the operation the patient felt easy; the pulse was 90 and soft; the heat of both limbs much alike, and somewhat below the natural temperature. At four there was great diminution of heat on the whole limb, and the foot and toes were quite cold; he was anxious, and complained of great numbness; hot flannels were applied, and used with gentle friction; bottles filled with hot water were fixed to the soles of the feet, and along the leg. At seven the anxiety had increased, and the pain was excessive, with a sense of great coldness; he tossed about, and was very restless; some discoloured patches were discovered on the calf of the leg. Through the night the pulse was generally full, varied from 80 to 92, and for a time intermitted; he was irritable, and the countenance anxious; complained of the most excruciating pain, the same feeling of coldness, and want of power over the leg; was otherwise easy. Two

anodyne draughts were administered, but he slept little, or not at all; towards morning he thought himself easier; the warmth to the limb was kept up the whole night, but the instant the applications for this purpose were removed, the temperature sunk.

Through the day of the 29th, the anxiety and restlessness rather increased, accompanied with the same pain and numbness; the discoloured patches had enlarged; the skin was soft, the pulse full, with hardness; it never exceeded 100; tongue white and moist. Two doses of castor oil were administered, but without effect on the bowels; the limb was lightly swathed in flannel, and men were kept constantly sitting by his bed-side to keep their hands on his leg and foot; the hot bottles continued; during this night he slept well, but complained of excessive pain whenever he awoke.

On the 30th, the wound of the operation was dressed, and appeared irritable; the pulse was full, and very hard; the tongue white and moist; the skin hot; expressed himself easier, but was restless and complained of the same want of feeling; thermometer on the thigh rose to 86°; small doses of neutral salts were administered every three hours, and 16 oz. of blood taken away, which was buffed and cupped. The patient seemed generally relieved by the subtraction of blood, but complained of aching pains below the knee. Two spots of

sphacelus appeared about the ancle joint; bowels were evacuated towards the evening, and the evacuations were natural; he slept but little during the night; was in much pain, and tossed about in great anxiety; perspired at times freely. On the morning of the 31st the pulse had risen, was very full and hard; the patient complained of pain over the abdomen, increased by pressure; the wound was very highly inflamed; 12 oz. of blood were taken away; it was found equally buffed and cupped with the former; the bowels were kept open, and poultices applied to the wound. He appeared better and easier through this day, than at any time since the operation; the limb had a cadaverous odour; towards night the pulse being still hard, and having still pain of abdomen, 8 oz. of blood were further subtracted; the thigh was discoloured; there was no increase of natural heat, or diminution of the sense of numbness, or of the general restlessness. He passed the night in great anxiety and distress, and in the morning the whole limb, for some three inches above the knee, was livid, and had vesicated in several places. He took a little wine at times through the day, but the constitutional powers gradually sunk, and he died at four in the afternoon of the 1st of September.

Dissection.

On opening the abdomen in the usual manner, there appeared a general flush of the intestines;

the reflected peritoneum was of its usual transparency, and the cœcum was adhering to it by lymph over the iliac muscle. The ligature was on the artery close to Poupart's ligament, about an inch below the giving off the circumflex, and some quarter of an inch from giving off the epigastric. The wound of the operation was made as I intended. There was a small communication between the femoral artery and vein at the side of the tumor, about an inch and a half below the origin of the profunda; on the superior part the covering of the aneurism was formed by the sheath of the vessels, and the fascia of the thigh. The profunda was neither thickened nor enlarged. The whole limb was in a state of gangrene.

SOME OBSERVATIONS

CONCERNING

THE MEDICAL PROPERTIES

OF THE

PYROLA UMBELLATA,

AND THE

ARBUTUS UVA URSI,

OF

LINNÆUS.

By PROFESSOR SMITH BARTON,
OF PHILADELPHIA.

COMMUNICATED IN A LETTER TO

B. C. BRODIE, Esq.

Read Nov. 14, 1815.

SIR,

IN the Fifth Volume of the *Medico-Chirurgical Transactions*, there is a paper by Dr. William Somerville, on the diuretic operation of the Pyrola Umbellata of Linnæus, in which he states that he has not, in any of the books consulted by him, met with any intimations concerning the medical powers of this beautiful little shrub, except the solitary observation of F. Pursh. I beg to refer to my "Collections for an essay towards a Materia Medica of the United States *," for an account of

* Third Edition. Philadelphia, 1810.

this plant; and I shall now add some of the further observations which I have collected on the same subject, and which I request you to lay before the Society.

There seems to be a good deal of analogy between the effects of the pyrola umbellata, and the uva ursi, as I have mentioned in the account to which I now refer; and in one case of intermittent, under the care of Dr. John S. Mitchell; the urine was increased in quantity, and was of a black colour. But the diuretic effects of this plant have not, I think, in general, been remarked by those who have been much in the habit of employing it in America. Yet it is probable that it is in part, at least, by virtue of its operation upon the urinary system as a diuretic, that it has been found so highly useful in one of these affections which I am presently more particularly to mention.

The black colour of the urine of a person who was under the use of the pyrola, is worthy of notice, especially as the late Dr. Heberden has recorded nearly a similar appearance in the urine of a patient who was using the uva ursi, a plant, it has already been observed, most closely allied to the America pyrola. The explanation of the fact, in both cases, is rendered the more difficult to me, as my own experiments, and those of several of my pupils have satisfied me, that iron never does manifest itself in the urine of those patients who have been taking

even very large doses of the preparations of this metal, and continuing their use for a long time. I know, indeed, that Mr. Lorry has made a contrary assertion. Besides, the patients using the pyrola and the uva ursi, had not been taking iron.

It has been intimated by Dr. Somerville, that the pyrola umbellata is an Indian remedy. The plant is, indeed, a principal article in the Materia Medica of the Indians of North America. But I am not acquainted with all the diseases in which they employ it. Two of these diseases are rheumatism and fever. In both they employ a strong warm decoction of the whole plant, and give it in such large quantities that it does not, and could hardly, fail to excite copious perspiration. By this operation, and by this I presume principally, the medicine has often been found very useful in the two complaints which I have just mentioned.

Nor has the practice of using the pyrola in fevers been confined to the Indians. The white inhabitants of many parts of North America also employ it. I am assured, on good authority, that it was very extensively employed, and with excellent effect in many cases of the typhus fever, which, under the appellation of "camp fever," prevailed among the American troops, and carried off great numbers of them, during the time of the revolutionary or first American war. A decoction of the plant was used, and I believe that it was chiefly of ser-

vice, by exciting perspiration very largely. At present we hear but little of the use of the pyrola in such cases of fever; it having given way to the employment of the eupatorium perfoliatum of Linnæus, which is perhaps more entitled to attention. I have made more particular mention of this eupatorium in my *Collections*, Part First, pages 28, 55; and in Part Second, pages 22—26.

All my trials and inquiries respecting the pyrola embellata have convinced me, that it is an important antilithic: not less so than the uva ursi, which, with me, is no mean commendation. For I have, certainly, in my frequent trials of the latter, in cases of nephritis, and especially nephritis calculosa and arthritica, very generally found it eminently useful. It has even seemed (however different may be the explanation of the fact) to favour the expulsion of granules of calculi, an effect which Dr. Hencher, a long time ago, ascribed to various vegetable astringents.

Dr. Somerville, whose paper is chiefly occupied with an account of the diuretic properties of the pyrola umbellata and its good effects in dropsies, informs us, that the Hurons and other Indian nations, "use it in gravelly complaints very commonly." This simple intimation is nearly sufficient to convince me, that the whites, or European Americans, derived their first knowledge of the antilithic powers of this plant from the Indians. In truth,

notwithstanding all that has been said, by declaimers of a certain description, and by superficial observers, concerning the paucity of the diseases of the American Indians, and of their peculiar exemption from the most grievous maladies, which so often embitter the days of the civilized man, the Indian, or man of America, is by no means exempted from calculous affections. This, indeed, is so far from being the case, that we have already derived from the savages of North and of South America, several of our real or reputed antilithics, such as, not again to mention the pyrola umbellata, the cissampelos pareira, and the xylosteum tataricum. I hope, at no distant period, to communicate to your very respectable Society, the free result of my inquiries concerning the diseases and remedies of the Indians of North America.

If future and more extensive trials shall completely confirm the observations of Dr. Somerville, concerning the highly diuretic powers of the pyrola umbellata, there can be no doubt of the propriety of introducing this vegetable into general practice, and of our bestowing upon it a respectable position in the catalogue of remedies for dropsies. Its tonic power which is mentioned by Dr. Somerville, and for which there is just foundation, may possibly give the American plant some advantages over other diuretics that are in common use, and which possess, in our usual mode of managing them, nothing, or but little, of the robust quality; as for ex-

ample, digitalis and squill. For it must be obvious to every practitioner in the least conversant with the nature and treatment of different forms of dropsies, that it is often a matter of the first importance to employ, in the intervals between the use of the debilitant diuretics, the *remedia roborantia*, such as some of the purer bitters, quassia, columbo, &c. and even small doses of opium; and what will often, perhaps, be of more importance, the invigorating and happy influence, in such cases, of a sea voyage. The necessity of using even powerful roborants, is especially indicated in the management of those dropsies, whether anasarca, hydrothorax, or ascites, which return periodically, as in the tertiana hydropica, which I have more than once had occasion to see in the United States; and for which the bark, with crystals of tartar, will sometimes be found the best remedy. It is not necessary to pursue this subject to a greater length; though my inclination would lead me to speak of the happy effects of blood-letting, of mild cathartics, and of a vegetable diet, in many cases of dropsy which have fallen under my immediate notice.

Returning more immediately to the pyrola umbellata: I agree with Mr. Pursh, that this plant is not a legitimate species of the genus of pyrola, and accordingly, a long time ago, I bestowed upon it another generic appellation, associating along with it the pyrola maculata of Linnæus, another American

plant, which is sometimes called "rats-bane," in the United States, on the supposition (certainly unfounded), that this plant is a powerful poison. I have elsewhere mentioned the uses to which the North-American Indians apply the pyrola rotundifolia. See *Transactions of the American Philosophical Society*, Vol. III.

The pyrola umbellata is one of the plants (not few in number) which are common to the old and new worlds. Whether in the north of Europe, or in the south of Asia, (in both of which it is indigenous,) it is applied to any medical purposes, I know not. Gmelin, in his *Flora Siberica*, says nothing of its medical qualities.

I am, Dear Sir,
With much respect, and with true esteem,
Your friend, &c.

BENJAMIN SMITH BARTON.

London, August 24, 1815.

TO B. C. BRODIE, ESQ.

A CASE

OF

OSSIFICATION AND BONY GROWTH

OF THE

CARTILAGES OF THE LARYNX,

PREVENTING DEGLUTITION.

By FRANCIS TRAVERS, M.D.

OF NEWARK, NOTTINGHAMSHIRE.

COMMUNICATED BY

MR. TRAVERS.

Read March 5, 1816.

MRS. M. about 50 years of age, who up to this period of life had uniformly enjoyed a good state of health, early in the spring of 1815, began to experience some uneasiness when she attempted to swallow; this she attributed to a slight enlargement of the left tonsil. The difficulty which attended deglutition, however, increased so rapidly, that she was soon compelled to relinquish solid food, and to support herself solely upon spoon victuals; in the course of a little time even this mode of sustenance was almost denied to her, when becoming alarmed for her situation, about the beginning of the month of October, she consulted a respectable surgeon of this town, who observing the

tonsil to be enlarged, prescribed an astringent gargle with an alterative course of calomel. At the expiration of a fortnight, this treatment having failed to afford any relief; I was requested to visit her in conjunction with Mr. Calton, surgeon, of South Collingham. The tonsil had increased to the size of a walnut; it appeared to be firm in its structure, and protruded considerably over the entrance to the pharynx; to this cause solely, our patient attributed her present state of suffering; at our request she endeavoured to swallow a little milk and water, this she at length effected, but not without much pain and difficulty. As the further administration of medicine was not in our opinion likely to prove beneficial, and as the situation of the patient was such as to require immediate assistance, we determined upon removing the diseased gland. On the succeeding day therefore the operation was performed by Mr. Calton, in the following manner; a small curved needle having attached to it a silk thread, and firmly held between a pair of forceps, was passed through the centre of the tumor; it was then brought out of the mouth and being cut off, the two ends of the ligature were united, forming a kind of bridle, which being held by an assistant, the surgeon with a spatula in his left hand depressed the tongue, whilst with a small scalpel in his right, he removed the diseased gland which in structure appeared to be cartilaginous, having a cyst for its base, from which nearly a table-spoonful of caseous fluid was discharged. The disease being

apparently removed, we requested our patient to renew her attempts to swallow some milk and water, but to our concern the difficulty still existed, and hardly any advantage seemed to have been gained by the operation. We began now to suspect that we had mistaken the true cause of obstruction, and our suspicions were soon confirmed, for upon passing the index finger of the right-hand as far as it could reach down the œsophagus, a projection was distinctly felt filling up the whole of the canal, except at its left and posterior part, where only a small dilatation could be perceived; into this a common urethral bougie was introduced, and every warrantable degree of force was used for the purpose of urging it forwards, but without success. As the nature of this projection could not from its peculiar situation be distinctly ascertained, we did not feel ourselves justified in having recourse to the aid of instruments; our patient was already on the brink of exhaustion; nourishing glysters were frequently administered, but upon this feeble support life could not be expected long to exist, and in less than a fortnight after the operation, this melancholy case terminated fatally. Leave being obtained to inspect the body, the following appearances were observed on dissection. The cricoid and arytenoid cartilages were much increased in size, and completely converted into bone; by pressing upon the œsophagus an obstruction was offered to the passage of food, and a distinct circular line was seen upon the posterior part of the

œsophagus, occasioned by the pressure of the cricoid cartilage; both above, and below the obstructed part. The œsophagus was natural in appearance. The remaining cartilages concerned in forming the larynx and trachea appeared in a slight degree to partake of the same morbid change. The thyroid gland was not increased in size, but it was firmer than usual, and many small depositions of bone were distributed throughout its substance.

OBSERVATIONES QUÆDAM

DE

HOTTENTOTIS,

PRÆSERTIM DE

STRUCTURA GENITALIUM PECULIARI HOTTENTOTARUM.

AUCTORE GULIELMO SOMERVILLE, M.D.

INSPECTORE PRIMARIO NOSOCOM: MILITAR: SOCIETATUM REG: EDIN: MEDICO CHIRURG. LINNEÆ & GEOLOGICÆ SOCIO.

Read March 5, 1816.

OMNES fere qui de Promontorio Africæ Australi Capite Bonæ Spei dicto scripserunt, peculiarem partium genitalium Hottentotarum fabricam notârunt: eorum autem scripta adeo inter se discrepant, adeoque obscura sunt, ut non desint qui dubitent in qua genitalium parte, insit mira illa varietas; quod oriri potuit vel ex inscitiâ scriptorum, vel ex inutili ipsorum studio, res quas viderant, parum aptâ similitudine illustrandi.

Nobis consilium erit ea tantummodo proferre, quæ ipsi vidimus, de hujus partis generis humani structurâ.

Multum enim Hottentotæ a fœminis vicinarum

gentium differunt, vultû, colore, vestitû, moribus; maxime autem sermone, non solum quôd ad vocabula, verum etiam modo sonos proferendi, qui quantum nos notavimus, nusquam alibi auditur.

Variarum tribuum hujus gentis in staturâ maxime notabilis est differentia; ab omnibus vero aliis gentibus adeo differunt, ut ne mutua quidem cum finitimis matrimonia per multa secula, propria vultus lineamenta deleverint.

Hottentotis plerisque statura aliquanto brevior quam Europæis est.

Cutis haud multum absimilis est colore folii caduci: sunt etiam quibus totius corporis lividus pallor cadaveris colorem æmuletur, dum apud maxime fuscos genæ nonnihil rubent.

Caput rotundum parvum: tempora tenuiora, oculi magis distantes quam aliis gentibus observatur: intervallum inter oculos solitâ prominentiâ caret, quam in Europæis dat unguen nasi: oculi canthus interior ellipsin non angulum facit.

Non alienum a nostro proposito videtur hîc notare, Hottentotos ut alios homines rudes visus acumine pollere: nonnulli feras venandi aut hostes effugiendi perpetuâ fere consuetudine, hâc facultate adeo pollebant, ut in campis arenosis vestigia observare possent, ubi aliis nihil omnino appa-

reret: hanc facultatem enim, utpote tum ad victum tum ad salutem ipsam prorsus necessariam, assidue exercent, et sic mirum in modum acuunt.

Nasus valde simus ab origine in fronte usque ad extremam partem: os magnum, saltem longum est, raro tamen hiat ut apud Æthiopes: labra tenuiora quam Æthiopum et nonnihil rosea: dentes candoris eburnei: cutis frontis, prima etiam ætate, rugosa ex conatû assiduo lucem quam maxime excludendi.

Hottentotorum magis quam Æthiopum capilli texturam lanæ referunt, crescendi autem modo longe absimilis, nam capilli, vel potius pili, vel lana, haud totam capillitii superficiem occupant, sed a locis quibusdam æquis intervallis inter se distantibus prodeunt, eodem fere modo quô setarum fasciculi scopis inseruntur: ubi, quod raro evenit, capilli duorum pollicum longitudinem attingunt, inter se coeunt & implicantur floccorum instar lanæ.

Aures parvæ, elegantes, interdum etiam ad arbitrium mobiles.

Huic genti, fasciarum in infantibus, pileorum in ætate provectioribus, nullus usus. Deformitas rarissima est nisi ex casu aliquo. Thorax amplus, corpus erectum, artus torosi et agiliores multo quam facile crediderint quibus vestitus arctior est familiaris.

Res notatû dignissimæ in Hottentotâ hæ fere sunt: ætate pubere mammæ fiunt longæ, rotundæ ac firmæ, papillæ vix eminent ultra mammæ ipsius circulum, et latiore quam in aliis mulieribus cinguntur. Brevi post pubertatem, magisque dum uterum gerunt, papillæ aliquantum crescunt, nec unquam omnino recedunt: mammæ post partum alterum tertiumve flaccidæ, rugosæ ac pendulæ fiunt, interdum ad inguen usque descendunt, utribus de collo suspensis simillimæ.

Nates non more solitô leniter rotundæ ad lumbos exsurgunt, sed recte exeunt, quasi corpus antrorsum inclinatum esset. Nec rara exempla Hottentotarum, quibus nates adeo ultra modum prominent, ut vix non credas hanc gentem ita fabricatam ut ore erecto non ambulet. Nates pro reliquo corpore tam magnæ, procul spectanti sane speciem appendicis extraneæ præbent.

Fabrica vero pudendorum Hottentotarum ab omni alia muliere maxime secernunt. In monte Veneris pubes interdum nulla, plerumque parca et mollis instar lanæ, quæ pro capillis crescit in capite. Os pubis minus teres est minusque obesum quam apud Europæas.

Ex interiore parte rimæ pudendi, substantia laxa, pendula ac sæpe rugosa descendit, quæ curiosius explorata duplex esse reperitur, ex nymphis productis constans, adeo arcte inter se cohærentibus, ut

simplex esse videatur. Nymphæ in quibusdam extra marginem labiorum quinque uncias descendunt.

Hottentotæ infanti rima adeo hiat ut nymphæ appareant, & puberem circa ætatem paullatim prodeant. Attamen ex maturâ admodum Venere, brevi flaccescunt et tandem marcidæ fiunt et rugosæ. Hottentotis labia exteriora minora sunt et minus prominent quam aliis mulieribus, interdum etiam adeo sunt tenuia ut pene deesse videantur et difficile omnino sit scitû ubi labia desinunt, ubi nymphæ incipiunt.

Clitoris solito loco sita, angulo nempe ubi nymphæ inter se dividuntur, fabricam peculiarem de quâ agitur, ipsis nymphis inesse monstrat.

Urethra aliæque partes vicinæ eundem habent situm ac in aliis fœminis: hæ autem omnes ex tenuitate labiorum et montis Veneris, magis prominere videantur.

Si ullus mos apud Hottentotos valeret quô nymphæ longiores redderentur, vix nobis latuisset. Nil boni autem a nymphis adeo promissis ipsæ Hottentotæ oriri putant, neque iis curæ est aut cordi nymphas longas habere: quibus longissimæ sunt non ideo pulchriores habentur, neque spernuntur quibus sunt maxime curtæ.

Si quicquid fuisset huic regioni proprium cui

rem referre potuissemus, omnium incolarum nymphæ longiores fuissent.

Quæcunque fuerit origo et causa insolitæ hujus fabricæ naturalium in fœminis Hottentotis, ipsa jamdudum adeo inveteravit, ut neque spes neque ratio ulla supersit, eam penitus indagandi.

Regionem nescimus unde hæc gens olim migraverit. Verisimile enim est Cafros aliasque a septentrione et oriente vicinas gentes quibus color niger est, Hottentotos a pristinâ ipsorum sede et domicilio pepulisse. Multaque suadent, Cafros aliasque quasdam gentes Africæ, Arabâ satas esse stirpe. Minime autem licet ex paucis quæ hactenus innotuerunt, aliquid statuere de origine et antiquâ variarum gentium historiâ, quæ immensam hanc incolunt continentem, per totam superficiem omnesque suas oras "leonum aridam nutricem." Cœlum enim, solum, herbæ, animalia, tum per littora maris Mediterranei, tum ad Bonæ Spei Promontorium, mire inter se similia. Plinius insuper de incolis regionum Africæ a sedibus Hottentotorum longe remotis, hæc verba habet, "nymphæ aliquando enormes sunt quare Coptæ et Mauri circumcidunt,"—quibus plane indicat, Coptas Maurosque istis temporibus ab aliis Africæ gentibus ad Septentrionem et ad occidentem incolentibus, discretos fuisse, ipsâ naturalium fabricâ, quâ ut ostendimus, Hottentotæ differunt a fœminis vel maxime vicinarum gentium.

Ex gente vagâ ab inimicis oppressâ, rebus adversis fractâ, rerum gestarum historia expectanda non est, neque traditionibus eorum siquæ fuerint, fides habenda. Atque pericula & labores iis subeundi, quos scientiæ amor, ad has arenosas regiones visendas, parum adhuc a nobis investigatas, impellere possit, tot ac tanta sunt, ut vix non desperem partes Africæ internas, prius exploratum iri quam adolescentes quidam in Mauritaniâ, hoc consilio instituti, et sermonis rituumque Maurorum periti, rem magnam fuerint aggressi.

Jam tantum notanda sunt quæ peculiaria cadavere inciso vidimus in Hottentoti corpore: nempe, cranium valde rotundum, malarum ossa altissima, oculi vero orbita Europæorum similis.

Natium magnitudo ex ingenti adipis massâ inter musculos & integumenta interpositâ oritur, quæ in cadavere quod inspexi, quatuor digitos crassitudine excedebant. Spina Dorsi et pelvis ut in Europæis bene formatis: neque verum os coccygis retrovertitur instar caudæ, ut quidam perhibent.

Partes genitales internæ fabricam solitam situmque ut in Europæis habent.

CASE

OF

GUNSHOT WOUND

OF THE

SHOULDER JOINT,

WHERE THE HEAD OF THE OS HUMERI,

TOGETHER

WITH PARTS OF THE HUMERUS,

WERE SUCCESSFULLY REMOVED;

By WILLIAM RICHARD MOREL, Esq.

SURGEON TO THE FORCES; SURGEON TO THE YORK HOSPITAL, CHELSEA; AND SURGEON TO THE WESTMINSTER HOSPITAL.

COMMUNICATED BY

SIR JAMES MACGRIGOR.

Read March 5, 1816.

IN the late severe contest in which we have been engaged in the Peninsula, many soldiers who had unfortunately experienced compound fracture of the shoulder-joint, have suffered amputation of the arm at its articulation with the scapula, by which they have not only been deprived of their limb, but in consequence of such their helpless state, have been compelled to depend in a great measure upon others for that assistance, of which, had their limbs been preserved, they would not have stood in need.

The following case which I have the honor to lay before the Medical and Chirurgical Society, will shew that it is not always necessary to have recourse to so dreadful an operation, as the removal of a whole member, for the preservation of life, even apparently under very unfavourable circumstances.

I wish to impress, particularly upon the minds of the junior part of the profession, this incontrovertible truth, *viz.* that it is far more honorable and praise-worthy to attempt the preservation of a limb, than to remove it, however dexterously such operation be performed.

The preservation of a limb is at all times of the greatest consequence to an individual; but to that class of society who are obliged to earn a daily subsistence by labour, it is of the highest importance, and I would wish them always to bear in mind the very impressive words of our great master, Mr. Pott, "that an amputation is an operation horrid to see, terrible to bear, and must leave the unhappy person on whom it has been performed in a mutilated imperfect state."

Case of Thomas Ellard.

Thomas Ellard, a private in the 18th hussars,

aged 32, strong, muscular, and apparently free from any kind of disease, was admitted a patient of York Hospital, September 13th, 1815, for a gunshot wound of the left shoulder, received at the battle of Waterloo.

The ball had passed through the head of the os humeri, about an inch and a half below the scapular extremity of the clavicle, as may be seen by a reference to the annexed Plate. In addition to the two wounds made by the entrance and exit of the ball, there was a third occasioned by an abscess which had formed, and which had been opened, and from which some small fragments of bone had been extracted. The situation of this latter opening was a little below the insertion of the pectoralis major, and upon examination with the probe was found to communicate with two former ones. In whatever direction the instrument passed, shattered pieces of bone could be felt.

From the long and constant irritation kept up by the fractured portions of the head of the bone, and the profuse discharge of offensive matter which they occasioned, the health of the patient was evidently on the decline, and as it clearly appeared that nature of herself was unable to remove the offending cause, there remained the alternative of either removing the member at its articulation with the scapula, or of attempting to preserve it by cutting out the shattered portions of the bone.

The advantages likely to result to the patient in point of seemliness, utility and comfort, from the latter operation, should it prove successful, were so obvious that I hesitated not to prefer it; and on explaining to the patient the circumstances which rendered the operation necessary, he very readily gave his consent.

On the 22nd of November, in the presence of most of the medical officers of the York Hospital, and other gentlemen, an assistant having made pressure with a boot-hook wrapped up in a piece of lint, upon the subclavian artery, as it passes over the first rib, I made an incision through the integuments and deltoid muscle, vide Plate II; commencing at the upper orifice, and continuing it in a semilunar direction to the opposite side, with the intention of forming a flap, similar to that which is made when the arm is to be removed at the articulation.

In dissecting the deltoid muscle from its connection with the bone, I had some difficulty; the cellular membrane having acquired a cartilaginous thickness. The flap being raised up, I dissected a little round the head of the bone, and then introduced my finger, which passed through it; several splinters were felt adhering to, and entangled with the muscles. As the separation of these pieces would have been tedious, and the sufferings of the patient thereby unnecessarily prolonged, I pro-

ceeded to the removal of the head of the bone, by dissecting round it as well as circumstances would allow, which was accomplished, not without some difficulty, as the capsular ligament was considerably thickened, and with the head of the bone formed one confused mass. This, however, being effected, I, by the application of the saw to that part of the bone into which the tendon of the pectoralis major is inserted, removed the anterior half of the bone, and with it two smaller fragments. This gave me an opportunity of examining the remaining half of the bone, which was thrown back under the edge of the cup of the scapula, or glenoid cavity as it is called. To remove this, it became necessary to separate the capsular ligament from its connection with the neck of the bone, and contiguous muscles, *viz.* teres major, pectoralis major, latissimus dorsi, and subclavius. The remaining portion of the bone being now removed by the saw, the flap was brought down and preserved in contact with the lower portion of the deltoid muscle by slips of adhesive plaster, compress and bandage.

This operation took up nearly three quarters of an hour. Two arteries only required the ligature. On sawing through the posterior portion of the bone, an artery sprang from the interior substance of it; but the hæmorrhage was immediately suppressed by a dossil of lint dipt in spirits of turpentine. I should suppose that the man might lose during the operation about two pounds of blood,

an occurrence to be considered rather as favourable than otherwise. He bore the operation with great firmness; was carried to his bed; the shoulder and arm ordered to be kept constantly wet with cloths dipt into cold water, and in the evening an opiate was administered. I visited him in the evening, and found him in all respects as well as I could wish.

23rd. I visited him about ten o'clock this morning; found him in good spirits; slept but little during the night, and complained only of soreness; skin moist; tongue clean; countenance cheerful; pulse about 120. He was put upon spoon diet, and the opiate ordered to be repeated.

24th. Slept pretty well, and said he was not in any one respect worse than he was before the operation.

This morning I removed the dressings, which from their stiffness had occasioned some uneasiness, and found all quiet; perfectly free from pain, inflammation, or tension; edges of the wound in contact; skin temperate; pulse 102; tongue clean; slept a little at intervals; rather languid, not having had an evacuation since the operation. I gave him half an ounce of sulphate of magnesia in a little peppermint water, and repeated the opiate in the evening; a small quantity of broth was allowed.

26th. Slept pretty well; complains of pain this morning; pulse as usual; slight nausea at stomach; as the salts had not the desired effect, a common injection was prescribed; wound appeared clean and healthy; on the removal of the dressings, a small quantity of well formed pus issued from the anterior shot hole. Rice pudding was allowed today, in lieu of the broth, which he did not relish.

27th. Passed the preceding night ill; shoulder on inspection swollen and inflamed; pulse 100 and quick. In the early part of the morning, feet chilly. On removal of the dressings, a considerable quantity of pus discharged itself from the anterior shot hole; the posterior part of the wound was united, by florid and healthy granulations. After visiting the hospital, I returned again, and found that the injection had been discharged without bringing away any fæces. I accordingly prescribed the following medicine.

℞ Magnes: sulph: ℥iss.
Aq: menth: sativ:
——Puræ āa ℥iv.
Spirit: pimento ℥i. M.

A fourth part to be taken immediately, and repeated every two hours until the bowels shall have been well emptied.

Two doses of this mixture produced a copious

evacuation. In the evening I found him greatly relieved; arm less inflamed; skin moist; pulse rather quick and languid. On account of his bowels having been a little ruffled by the salts, I added this evening, confect. aromat. ℈j. to the night draught.

28th. Perspired freely during the night, but did not sleep; tongue clean; pulse reduced to about 76; free from ain. In the course of the night had two evacuations; discharge copious, but of good colour and consistence; has had no return of chills.

29th. Slept well; pulse soft, and natural; discharge good, and diminished in quantity; appetite good. Having expressed a desire for some fish, I indulged him with a small quantity; and some port wine and water, weak, was also allowed. The opiate was repeated in the evening.

30th. Slept well; had a stool early in the morning; in all respects as on the preceding day; some coffee was given in lieu of the tea, which disagreed with his stomach.

Dec. 1st. Slept well; had two stools in the course of yesterday; wound clean; granulations healthy; discharge moderate; appetite good;

diet ordered to be continued; opiate at night omitted.

2nd. No alteration since yesterday.

3rd. Slept well; discharge moderate, and good; bowels inclined to be costive; wound florid; the arm appears to be shortening, the consequence of the retraction of the muscles; the upper part of the shaft of the bone may be distinguished by the touch, extending rather forward towards the axilla, than in the direction of the glenoid cavity. I therefore brought the arm a little over the breast, and by means of a compress and splint applied to the inside of the arm, extending from the axilla to the internal condyle of the humerus, kept it at some little distance from the side. The fore-arm was well supported by a sling, to which was applied a strap that passed round the neck.

4th and 5th. Has not any thing to complain of, and sleeps well; granulations increasing fast.

6th to 11th. No change has taken place except the rapid increase of the granulations, which I ordered to be repressed by bandage and lint, dipt in a solution of cuprum vitriolatum, in water.

12th. Had a slight rigor in the evening, and complained of being cold, particularly in his feet;

pulse 120, with headach and thirst. Some castor oil had been given before I arrived, which produced sickness, and he vomited a considerable quantity of bile; and in the course of the evening had several evacuations. This sudden change I attributed to indigestion brought on by too early an alteration of his diet; I therefore discontinued the fish, and put him again upon broth made of lean beef.

His stomach and bowels having been considerably disturbed, I found it necessary to administer the following cordial mixture, of which he took occasionally two or three table spoonsfull.

℞ Mistur. camphor. ʒij.
Aq. Puræ ʒvj.
Confect. aromat. ʒij. M.

13th. Slept a little during the night; stomach and bowels quite easy. The lower orifice, where the abscess had been opened, was slightly inflamed, and an abscess appeared to be forming.

14th. Found on visiting him this morning that he had passed a restless night; was sick, and generally uneasy; looked sallow, and for the first time since the operation, seemed out of spirits; bowels not open; an abscess had formed near the lower orifice; ordered the arm and shoulder to be

well fomented, and afterwards a poultice of linseed meal to be applied, and an injection of thin gruel, with a little salt and olive oil, to be thrown up in the evening, if necessary. This was had recourse to, and produced an evacuation.

15th. Inflammation diminished; some matter issued from the lower orifice; perspired copiously during the night; skin moist; tongue clean; pulse soft and regular; ordered the mixture to be discontinued, but the poultice to be repeated.

16th. Slept well; inflammation abated, and discharge lessened; in all respects better than on the preceding day.

To the 23rd. Continues to improve daily.

24th. Discharge trifling; inflammation entirely gone; wound nearly healed.

26th. Sleeps well; appetite good; countenance clear; is growing fat; wound healed; slight moisture from the lower orifice.

Jan. 3rd, 1816. The wound requires no further dressing, and the man is in excellent health. The distance between the cup of the scapula, and the extremity of the humerus, is not more than an inch and a half. On measuring the arm from the top

of the acromion to the points of the elbow, the difference between it and the other arm is about one inch and a fourth. There is a little motion in the shoulder, but all the variety of motions of which the fore-arm and hand are capable are preserved, and he is daily acquiring more strength.

I have within the last month seen the man: he is completely recovered, and has the perfect use of his fore-arm and hand.

4, *Belgrave Street, Pimlico.*
March 27, 1816.

CASES AND OBSERVATIONS,

ILLUSTRATING THE

INFLUENCE OF THE NERVOUS SYSTEM

IN REGULATING

ANIMAL HEAT.

By HENRY EARLE, Esq.

ASSISTANT SURGEON TO ST. BARTHOLOMEW'S HOSPITAL, AND SURGEON TO THE FOUNDLING HOSPITAL.

Read Feb. 20, 1816.

PREVIOUS to the interesting experiments published by Mr. Brodie, in the Philosophical Transactions for 1811, it was a generally received opinion, that animal temperature depended on the chemical changes which the blood undergoes in the round of circulation. On this supposition a beautiful and apparently satisfactory theory had been constructed. This much esteemed fabric of human reasoning has, however, received a severe shock from the experiments above alluded to, which tend to establish the following facts: that when the brain has been destroyed, animal heat ceases to be generated, notwithstanding the functions of respiration are artificially continued, and ap-

parently all the chemical changes are produced in the lungs; and further, that an animal thus subjected to artificial respiration, cools more rapidly than one that is simply killed by decapitation, probably in consequence of the circulating blood being exposed to the cold stream of air which is introduced into the lungs. From these facts it appears that nervous influence is essential to the production of animal heat.

Having met with some cases of impaired nervous energy which exhibited phænomena, powerfully illustrative of the above position, I have ventured to submit them to the notice of this Society, conceiving that a strict attention to the alterations in the natural functions, produced by accident or disease, must be considered as one of the least fallacious means by which we may hope to arrive at success in our physiological inquiries. In the present instance, the results arising from comparative experiments on animals, and those drawn from pathological observations, most happily correspond; but although they equally tend to prove the importance of the nervous system in regulating the temperature, we must not lose sight of the action of the circulation on the brain and nerves.

In the second part of this paper I shall offer some further observations on this subject, and illustrate it with instances of increased nervous energy,

which, together with the first set of cases, will tend to throw some light towards elucidating an obscure but beautiful function in the animal economy; whilst at the same time they will enable us, without much difficulty, to reconcile the discrepancies which appear to exist between the former theory of animal heat, and more recent discoveries.

Should the observations I have made, and the conclusions I have drawn, be deemed erroneous and untenable, I trust the facts at least will be sufficiently important to merit attention.

CASE I.

Thomas Anderson, a mariner, in the month of February, 1812, fell from the main yard into a boat alongside of the ship; he was stunned with the fall, and remained insensible for a considerable time. On recovering, he found that the surgeon had bound up his left arm, in consequence of a fracture of the collar-bone. After six days the bandages were removed, and the limb was found useless and paralysed. For about three weeks after the accident, on any attempt to move the limb, and at times when perfectly quiet, he felt violent pain, which he referred to the extremity of the fingers; but as they and the whole arm were

perfectly insensible to any impressions, it is probable that the pain was excited where the nerves were injured under the clavicle, and that the percipient mind referred it to the extremities, as is frequently the case after amputation.

This painful stage gradually abated, and the arm remained perfectly palsied and useless. In this state he applied to me, about the end of August. From the history of the case it appeared most probable that the same blow which had fractured the clavicle, had lacerated or crushed the axillary plexus of nerves just as they pass under that bone. The circulation of blood did not appear to have suffered, the pulse at the wrist being synchronous, and equally strong with that of the other limb; yet the temperature was greatly below that of the healthy extremity. As he had never tried electricity, I determined to resort to it, conceiving that it might possibly have a beneficial effect in restoring sensibility. On examining the heat of the limbs previous to the use of electricity, I found it as follows. Left or paralytic hand 70°; bend of the arm 85°; axilla 94°. After drawing strong sparks for about ten minutes, the heat of the hand was increased to 74°; bend of the arm to 88°; axilla to 95°. The temperature of the other hand was 92°.

After using electricity for some days, he said that

he felt a degree of warmth and tingling which remained for a considerable time after its administration. In ten days I repeated the experiment in a more accurate manner, after placing him on an insulated stool. The temperature this time was:

		Before electricity.	After electricity.
Paralysed limb.	Hand	71	77
	Arm	80	83½
	Axilla	92	93
Healthy limb.	Hand	92	92
	Arm	95	95½
	Axilla	96	96

After some time sensation began to return in the integuments about the shoulder and inside of the upper arm; and the muscles of the scapula and great pectoral muscle began to recover their power. It was curious to observe this gradual return of sensibility; one part of the arm possessing natural feeling, another being morbidly sensible, and immediately beyond being quite insensible to every mechanical or chemical injury.

Being desirous of ascertaining if other stimuli acted as powerfully, or if the increased heat depended on any peculiar action of electricity; I determined to apply a blister to the back of the hand. I was obliged to repeat it several times before it would act; at last however a vesication

was produced. During the time that the blister was acting, there was no alteration in the thermometer placed immediately contiguous to the edge of the plaster; but on removing the bladder and applying the bulb to the denuded cutis, a rise of three degrees took place. Whether this depended on the stimulus of the blister, or on the removal of the cuticle by which a more internal part was exposed, I am not able to determine. The blistered surface was not in the least sensible to any injuries, and healed very readily. A short time after this, I recommended him to place his arm in a tub of warm grains, having previously ascertained with his other arm that they were not too hot. I was induced to recommend this remedy, from an idea that the returning sensibility might be aided by raising the temperature to its natural standard, by artificial means. He retained the arm in the pail for nearly half an hour, and on withdrawing it found the whole hand blistered in a most alarming manner, and at the extremities of his fingers and underneath the nails sloughs had formed. He said that he did not at the time feel the grains at all warm, nor did he experience the least pain. A considerable degree of inflammation spread up the absorbents, and matter formed in the axilla, which was soon absorbed and the inflammation assuaged. The temperature of the ulcerated surface of the hand varied from 80° to 86°, but from the constant application of warm fomentations and poultices, no very accurate result could be obtained, as

the limb was at all times liable to partake of the degree of heat of surrounding bodies. At the time when the sores were worst, he experienced a heavy aching sensation in the hand, which was not aggravated by any external injuries.

The progress of the case from this time was slow, but it continued to advance towards a perfect cure. He quitted my care soon after the ulcers were healed, and went on board a ship to act as cook, and I have not since seen or heard from him. When I last examined the limb, the shoulder and upper arm had regained their sensation and power; the integuments in front of the fore-arm were very tender when pressed. The skin on the back of the arm was less sore to the touch. His hand was still insensible, but he felt a consciousness of returning muscular power, and more than once thought that the flexor muscles did contract involuntarily. The temperature of the whole limb was sensibly increased, but the hand was still liable to be affected by the surrounding medium.

On reviewing the circumstances of this case, it appears that a limb deprived of due nervous influence is of a much lower temperature than natural, notwithstanding there is no apparent diminution in the circulation of the blood. That a limb so circumstanced is incapable of supporting any fixed temperature, and is peculiarly liable to partake of the heat of surrounding media; and lastly, that is

cannot, without injury, sustain a degree of warmth which would not be at all prejudicial to a healthy limb.

CASE II.

Maria May, aged 14, applied to me in the year 1807, in consequence of a painful affection of the inside of the fore-arm and hand, extending to the extremity of the little finger. She was unable to account for the origin of the complaint, and said that it had been gradually increasing for some months. At the time of consulting me, the whole course of the ulnar nerve from the elbow downwards, was morbidly sensible when touched; the mere drawing on a glove would sometimes cause so much pain as to make her scream and fall to the ground. The pain at times occurred spontaneously, without any apparent exciting cause. The integuments on the inside of the fore-arm near the elbow were hotter and fuller than natural. The pain deprived her of rest at night, and her general health was greatly disordered.

She remained under my care for above three years, occasionally suffering extreme torture; at other times being comparatively easy. During this long period a great variety of constitutional and topical remedies were resorted to in vain. During any severe paroxysm she always experienced most

relief from the application of leeches and cold evaporating poultices. In December, 1810, she was so much worse that I was induced to propose an operation, as the only probable means of affording any permanent benefit. I was well aware how frequently the operation had failed of curing the *tic douloureux* of the face, but was induced to look for a more favourable termination in the present instance, from the nervous communications being less numerous, and from the greater length of the nerve, which would enable me to make a division above the diseased part. Having fairly explained the possibility of the disease returning, she readily submitted to the proposed operation, with the prospect of obtaining temporary alleviation from her sufferings. Mr. Langstaff favoured me with his assistance at the operation. I made an incision of about two inches in length, beginning immediately behind the internal condyle of the humerus, and carrying it upwards in the course of the nerve. In making this wound, I exposed a considerable cutaneous branch, which I was afterwards induced to divide, in consequence of the morbid sensibility of the integuments it supplied. Having laid bare about an inch and a half of the nerve, an incision was made through it, at the part nearest the brain; the pain produced was very acute, and felt, to use the girl's own expression, like a violent electrical shock. It was however the last she had to suffer; the little finger and one half of the ring-finger from that moment lost all sensation, and the integuments

on the inside of the hand became perfectly void of feeling. Rather more than an inch of the nerve was dissected out as low down as where it passes behind the internal condyle. The neurilema covering the nerve appeared firmer and thicker than natural.

Her health mended rapidly, after this source of irritation was removed; she lost all her nervous sensations; the wound healed readily, and in about three weeks from the operation she was perfectly well. All the parts supplied by the ulnar nerve had lost their sensibility, and the little finger remained in a paralysed useless state.

A short time after, during severe frosty weather, she called on me in consequence of a blister having formed on the little finger, at the extremity of which, and under the nail, there was a slough. She was unable to account for this, unless from the severity of the weather; that finger being at all times much colder than any other part of the body. By keeping it constantly wrapped up in a warm linseed poultice, it soon healed.

Three several times after this she applied to me with a similar affection, arising apparently from sudden alternations of temperature, as the weather continued cold, and she was obliged to wash dishes in warm water of a temperature not at all unpleasant to the rest of the hand. I regret that I did

not then accurately ascertain the comparative heat of the finger and the rest of the hand; but at that time my attention was not alive to the subject, and I contented myself with noting down the phænomenon*.

From the circumstances of this case I conceive it admissible to conclude, that the want of power of supporting such variations of temperature as were perfectly harmless to the rest of the hand, was dependent on the want of nervous energy; as this was the only apparent deviation from a healthy natural state.

This opinion is greatly strengthened by reading

* Since writing this paper, I have had an opportunity of seeing my patient, and of making an examination of the state of her hand. The little finger still remained nearly useless; she can bend it when the other fingers are bent, but possesses little or no power over it, independent of the others. She feels when severely pinched or injured, but her sensation in it is still very imperfect, and it conveys a wrong impression of the form of bodies and of their temperature.

It is always colder than the rest of the hand; on examining it with a thermometer I found that when the bulb was applied to the outside of the root of the little finger it stood at 56°; between the roots of the little and ring-finger 57°; outer side of the fore-finger 60°; between the fore-finger and thumb, and in the palm of the hand 62°. The heat of the other hand was on the surface of the different fingers; 60° between the roots of the finger, and in the palm 62°. The temperature of the room was 55°.

It is now January 20th, 1816,—just five years since the operation was performed.

a highly interesting case of impaired nervous energy, accompanied with a loss of power of regulating the animal temperature, which was published by Dr. Yelloly in the Third Volume of the Transactions of this Society, to which I must refer for any further particulars.

As a further illustration of deficient nervous power, accompanied with a loss of temperature, I may mention, that in examining paralytic limbs I have invariably found them colder than any other part of the body, unless they have been kept artificially warm. Some time since a friend examined twenty-five cases in the Bath Hospital, and found the paralysed limbs in every instance below the natural standard.

In every case in which I have had an opportunity of making any inquiries, where the nervous energy has been materially impaired, the power of maintaining a healthy standard temperature has been in a greater or less degree lost, notwithstanding the circulation of the blood has been apparently unaltered, either in degree or quantity: clearly, in my opinion, proving the important share which the brain and nerves have in regulating and producing animal heat, and shewing, in a remarkable manner, that a perfect integrity of the nervous system is requisite to enable the body to resist the extraordinary variations of temperature to which it has been at times exposed, and to maintain under

these different circumstances a standard heat of its own, with scarcely any perceptible thermometrical change.

I shall now proceed to consider briefly, the phænomena produced on the nervous system by the changes which the blood undergoes in the round of circulation, and endeavour to ascertain how far such changes may be supposed to contribute to the production of animal heat; by observing the effect of any morbid alterations either in the quantity or quality of the blood, in augmenting or diminishing the temperature *. Previous, however, to entering on this subject, it will be right to premise, that it is not my intention to discuss the chemical nature of the changes effected by respiration, but simply to observe the sensible results of such alterations on the nervous system; as I do not conceive that it is of much importance to the present question, whether or not the venous and arterious blood contain the same proportions of oxygen, but in different states of chemical combination. It is sufficient to know that important changes do take place during the transmission of blood through the

* The experiments of Dr. Davy, on the comparative heat of arterial and venous blood, prove that the temperature of the former is greater than that of the latter, and that the temperature of the left side of the heart is greater than that of the right. Here then we have demonstrative evidence of the acquisition of heat during the pulmonary circulation; we must therefore consider the circulation of the blood as *one* source of animal temperature.

lungs, and that such changes are essential to the support of nervous action.

It is well known that when from any cause the proper supply of arterial blood is suddenly arrested, and the brain deprived of its wonted stimulus, syncope ensues, accompanied with a great diminution in the warmth of the body. In malformations of the heart; in the blue child for instance, and in all cases of difficult transmission of blood, whether from disease in the lungs or sanguiferous system, the nervous functions are more or less deranged; such persons being very liable to faint, and being at all times subject to great coldness in the extremities and whole body, accompanied with numbness and imperfect sensation. These facts are so well known that it is not necessary to dwell further upon them.

On the other hand, where the circulation of the blood is morbidly increased as in fever, the nervous functions are greatly deranged by the over excitement, and generally during a paroxysm the temperature of the body is increased, in some degree, in proportion to the violence of the other symptoms. When a sudden or great determination of arterious blood takes place to the nerves of any part, it is known to produce a local affection similar to the more general derangement caused by determination to the brain. This is the case in

many instances of amaurosis, which are remediable by copious bleedings.

The painful sensation produced by suddenly heating the hands after much exposure to cold, may likewise be referred to the rapid flow of blood over exciting the nerves. When this takes place to a great degree, and when the alternation of temperature has been very sudden, inflammation and sometimes mortification is the consequence; on this principle we apply cold to a frost-bitten limb, and gradually increase the heat to prevent the effect of a sudden over excitement of a part whose vital powers have been exhausted.

In no case, perhaps, is the effect of a local determination more marked than in *tic douloureux*. In every instance of this distressing malady which has fallen under my observation, during each paroxysm of pain, there was an evident increased flow of blood to the part, accompanied with an increase of heat more or less perceptible.

In the instance of Maria May related above, this was well marked. In a very interesting case which I have lately attended, of affection of the nerves of the forehead and face, there was a well defined red line in the whole course of the supraorbitary nerve, accompanied with so much heat as rapidly to evaporate any cold washes which were applied.

In another case of a middle-aged widow lady, who had been afflicted for years with *tic douloureux* of the inferior maxillary nerve, for the cure of which she had submitted to several operations, but who still at times suffered from pain in the deep seated temporal branches, the gustatory nerve, and all the branches supplying the masseter, pterygoid and buccinator muscles; during each paroxysm there was a violent pulsation in all the branches of the external carotid artery, which terminated generally in a most profuse flow of saliva, after which she experienced temporary relief.

In all these affections, the local abstraction of blood and the application of cold are found most beneficial, and occasionally immediate ease is obtained, by forcibly compressing the part, and thus diminishing the influx of blood. A curious instance in illustration of this was lately mentioned to me. A blacksmith, who for many years had suffered from a violent pain in the nerves of the forehead whenever he exerted himself, accidentally found that he obtained ease by compressing the trunks of the temporal arteries; upon which he contrived a strong spring with a pad at each end, which he fixed on his head in such a manner as to compress the temporal arteries. This spring he wore whenever he went to work, and was thus enabled to remain at the anvil all day without suffering.

That there is an increased flow of blood to the part in these painful nervous affections, is not only shown by the redness and arterial action, but has been proved by an interesting dissection mentioned by Bichat, of a case of painful affection of the sciatic nerve, where the vessels of the neurilema were evidently enlarged in size, and increased in number, so as to be quite tortuous.

A singular instance, illustrating the effect of an inflammatory determination of blood to a nerve, occurred to me in the course of last year, and tends much to corroborate the preceding remarks.

Maria Williams, a foundling, aged 32, who had been retained in the hospital in consequence of a deficiency of intellect, in February, 1814, wounded her arm with a fork, and punctured the external cutaneous nerve, about half way down the fore-arm. She experienced much pain soon after the accident, in the whole course of the nerve, and considerable inflammation took place in the neighbourhood of the wound. She was directed to keep the arm very quiet, and to apply evaporating washes. About three weeks after the accident she had occasion to use the limb, when she was suddenly attacked with great pain and a sense of burning in the seat of the original wound. Erysepelatous inflammation soon spread over the whole front of the fore-arm, which terminated in several

large vesications, giving an appearance very similar to the disease termed Pemphigus. The heat of the arm was very great, and quickly dried the damp cloths which were applied. By perfect rest, and evaporating poultices with opium, she soon recovered from this attack; but on attempting shortly after to use the arm, a recurrence of the same symptoms took place. The heat was so great this time as to lead me to ascertain its extent with a thermometer, when I found that the mercury rose nearly three degrees higher when applied to the arm, than when placed under the tongue. At this time vesication had taken place in some parts, and probably the temperature was lower than it had been in the previous stage of inflammation. Subsequent to this, she experienced four several relapses, all apparently induced by inadvertently using the arm. The last attack was in September, and differed somewhat in its character from the former; no vesications following the inflammation, and the appearance bearing more analogy to urticaria than to pemphigus.

The inflammation was always confined to the front of the fore-arm, and did not appear disposed to spread. The nerve during the whole time was acutely sensible when pressed. After September she retained her arm constantly in a sling for the space of three months, and has experienced no return of inflammation since.

The increased temperature in this case was very remarkable, and forms a striking contrast with the first case which I have related of crushed nerve, where the thermometer only rose to 74° when applied to the exposed cutis of a recently blistered surface. I consider this case as equally important in illustrating the action of arterious blood on the nerves, and in explaining the phænomena of inflammation. It is also strongly corroborative of the observations of Sir E. Home, detailed in some experiments which he published in the Second Part of the Philosophical Transactions for the year 1814, proving the influence of the nerves upon the action of the arteries; for I conceive there can be no doubt that these violent inflammatory symptoms were all produced by the injury done to the nerve, as they could at any time be brought on by exciting it in any way.

It appears then, from the evidence which has been adduced, in the first place, that an integrity of the nervous system is essential to the evolution of animal heat, and that when any part of it is impaired by accident or disease, the due performance of this calorific function is either partially or generally deranged. Secondly, that the stimulus of arterious blood is necessary for the excitement of the brain and nerves, and likewise for the proper developement of animal heat. Thirdly, that there exists a considerable sympathy between the

nervous and sanguiferous systems, and that an injury inflicted on a nerve is attended with an increased arterial action, and a local determination of blood. Lastly, that such a local determination, whether the effect of disease or injury is accompanied by a sensible increase of temperature at the part.

In conclusion, I shall offer some remarks on the curious phænomenon produced by placing a ligature on the principal artery of a limb, which has hitherto been difficult to account for, but which admits of a ready solution on the principle of vital heat being the result of the action of arterious blood on the nerves, (a conclusion which the facts related above would seem to warrant) whilst at the same time it affords a powerful illustration in support of such a theory.

When a ligature is placed on the principal artery supplying a limb with blood, the circulation in the smaller anastomosing vessels, and in the capillary system is much increased. The limb is furnished with a smaller quantity of blood, but what does circulate must necessarily pass through vessels of a smaller calibre, consequently they are preternaturally distended with blood; and if a limb be examined under these circumstances, it will be found that the communicating vessels are enlarged. They subsequently undergo a further change, and after

some time again contract to their former size. The effect produced by these changes on the temperature of the limb, is an increase of heat beyond the natural standard of the healthy limb, at that part immediately below where the artery is tied, which increase of heat gradually extends itself over the whole limb. This could not happen if the temperature depended solely on the circulation, as the actual volume of blood, the supposed source of heat, is lessened; but at the same time be it remembered, that the smaller order of vessels and the capillaries, in short those vessels which immediately supply the nerves, are receiving more than a due proportion, consequently the nervous system is over-exerted and more heat developed, first, at that part where there is the greatest impulse of blood, and subsequently over the whole limb, in proportion as the increased collateral circulation is established.

It may be urged in opposition to this explanation, that this increased temperature does not invariably follow the application of a ligature to the trunk of an artery. It will not be difficult to reply to such objections, when it is considered under what very different circumstances a ligature is applied, and that in many instances of aneurism the collateral circulation is in a great degree developed before the ligature is applied; in others, the main trunk below the aneurismal sac is obliterated; and in others again, a principal communicating vessel of the first order is given off a short distance above

the situation of the ligature; all which circumstances would very materially influence the results, for reasons too obvious to require explanation. In all the instances, however, in which I have known a ligature suddenly applied to the main trunk of an artery, in a limb which had not undergone any previous change, the increased temperature above described has been the invariable consequence.

Berners Street, Dec. 28, 1815.

OBSERVATIONS

ON THE

TREATMENT

OF

VARICOSE VEINS

OF THE LEGS.

By B. C. BRODIE, Esq. F.R.S.

ASSISTANT SURGEON TO ST. GEORGE'S HOSPITAL, AND LECTURER ON SURGERY.

Read April 16, 1816.

IT seems to be established by the experience of modern surgery, that a mechanical injury inflicted on the trunk of one of the larger veins, is liable to be followed by inflammation of its internal membrane, and a fever of a very serious nature; and the occasional occurrence of these symptoms after the ligature, or even the simple division of the vena saphæna, has occasioned surgeons to be cautious in performing these operations for the relief of a varicose state of its branches in the leg.

But are the same ill effects likely to take place if a similar operation be performed on the branches themselves? Reflecting on the following circumstances, I was induced to answer this question in

the negative. Varicose veins of the legs are so frequent in persons of the inferior order, (at least in this metropolis) that it cannot be otherwise, than that a considerable proportion of those who apply at the hospitals on account of wounds of the legs, must labour under this disease; yet I do not recollect an instance of venous inflammation following such an accident; neither has such an instance occurred among a great number of cases which have come under my observation, in which the varicose veins of the rectum forming piles, have been removed by excision or by ligature.

It was recommended by Celsus to destroy varices of the leg, by the cautery, or by extirpating them with the knife; and the same operations have been performed (though but seldom) by some more modern surgeons. The consideration of the circumstances, which have been just stated, led me to venture on the adoption of a practice somewhat corresponding (though not exactly similar) to that of Celsus. Finding that it was attended with benefit to my patients, and that no ill consequences ensued, I did not hesitate to repeat the experiment in a considerable number of cases. It is the result of my observations on this subject, which I have now the honor of laying before this Society; not in the belief that I am communicating surgical facts of the first importance, but hoping, nevertheless, that what I have to mention, will be found

not altogether undeserving the notice of the profession.

Where the whole of the veins of the leg are in a state of morbid dilatation, and the distress produced by the disease is not referred to any particular part; there seem to be no reasonable expectations of benefit, except from the uniform pressure of a well applied bandage. But not unfrequently, we find an ulcer which is irritable and difficult to heal on account of its connection with some varicose vessels; or, without being accompanied by an ulcer, there is a varix in one part of the leg, painful, and perhaps liable to bleed, while the veins in other parts are nearly in a natural state, or, at any rate, are not the source of particular uneasiness. In some of these cases I formerly applied the caustic potash, so as to make a slough of the skin and veins beneath it; but I found the relief which the patient experienced from the cure of the varix to afford but an inadequate compensation for the pain, to which he was subjected by the use of the caustic, and the inconvenience arising from the tedious healing of the ulcer, which remained after the separation of the slough.

In other cases, I made an incision with a scalpel, through the varix and skin over it. This destroyed the varix as completely as it was destroyed by the caustic; and I found it to be preferable to the use of the caustic, as the operation occasioned less

pain, and as (in consequence of there being no loss of substance) the wound was cicatrized in a much shorter space of time. I employed the operation, such as I have described it, with advantage in several instances; but some months ago I made an improvement in the method of performing it, by which it is much simplified; rendered less formidable, not only in appearance, but also in reality; and followed by an equally certain, but more speedy cure.

It is evident, that the extensive division of the skin over a varix can be attended with no advantage. On the contrary, there must be a disadvantage in it, as a certain time will necessarily be required for the cicatrization of the external wound. The improvement, to which I allude, consists in this: that the varicose vessels are completely divided, while the skin over them is preserved entire, with the exception of a moderate puncture, which is necessary for the introduction of the instrument with which the incision of the veins is effected. Thus the wound of the internal parts is placed under the most favorable circumstances for being healed, and the patient avoids the more tedious process, which is necessary for the cicatrization of a wound in the skin above.

For this operation I have generally employed a narrow, sharp-pointed bistoury, slightly curved, with its cutting edge on the convex side, such as

is delineated in the annexed drawing. Having ascertained the precise situation of the vein, or cluster of veins, from which the distress of the patient appears principally to arise, I introduce the point of the bistoury through the skin on one side of the varix, and pass it on between the skin and the vein, with one of the flat surfaces turned forwards, and the other backwards, until it reaches the opposite side. I then turn the cutting edge of the bistoury backwards, and in withdrawing the instrument the division of the varix is effected. The patient experiences pain, which is occasionally severe, but subsides in the course of a short time. There is always hæmorrhage, which would be often profuse if neglected, but which is readily stopped by a moderate pressure made by means of a compress and bandage, carefully applied. The same pressure which is necessary for the suppression of the hæmorrhage, is useful, as it keeps the divided surfaces in contact, so that they may have the opportunity of uniting by the first intention. With a view to the more certain attainment of this last object, care should be taken not to divide very extensively the soft parts below the varicose vessels. If the edge of the bistoury be sufficiently sharp, a moderate pressure will answer the purpose required; and if the pressure be considerable, a wound much deeper than is necessary will be the consequence. With the same view, the patient should be kept for the first four or five days in bed, in a state of perfect quietude, and when the bandage which has been applied is

removed, this should be done with the greatest caution, lest any union which may have taken place be destroyed, in consequence of the uniting substance not having as yet acquired the due firmness of texture. By attending to these circumstances, an immediate cure of the wound is generally effected: where it is otherwise, no very considerable time is necessary for it to become healed by the process of granulation.

In every case, in which this operation has been hitherto performed, I have found it to be followed by the obliteration of the varix, and, indeed, it is difficult to conceive how it should fail in producing this effect. Sometimes no vestige of the divided veins has been to be distinguished afterwards; at other times they have remained for a certain period full of solid coagulum, which has gradually been absorbed. This difference probably depends on the different degrees of pressure made by the compress and bandage, and on the circumstance of the pressure being confined to the line of the incision; or of its being extended over the whole cluster of dilated veins. If there have been veins in a varicose state below those, which have been divided, and communicating with them, these have become contracted in size, and usually have presented no appearance of disease afterwards. The good effects of the operation have however been most apparent in cases of varicose ulcer. In most instances the pain in the ulcer has ceased immedi-

ately. When the ulcer has been of a moderate size, it has sometimes been found perfectly healed in a few days, on the first removal of the bandages;—when it has been of a large size, it has begun to heal rapidly, although it had made perhaps little or no progress towards amendment under the treatment which had been previously adopted. Where there has been a varix below the ulcer, the division of it has been attended with more relief than that of the varix above the ulcer in other cases.

Inflammation of the coats of the veins has not occurred in any of the cases, in which I have hitherto adopted this method of treatment. I have already observed that there are some reasons for believing that the venous branches are less liable to be inflamed, in consequence of mechanical injury, than the trunks, in which they terminate. But, perhaps, something is also to be attributed to the integuments over the wounded vein being left entire. It is not unreasonable to suppose that a vein under these circumstances is not equally disposed to take on the action of inflammation with one, which after its division is exposed to the contact of the air, or other extraneous substance. The difference of the injury corresponds to that which exists between a simple and compound fracture, and it seems probable that there should be, to a certain degree, a corresponding difference in the effects which are produced.

In two or three cases inflammation of the adipose and cellular membrane has taken place, producing pain and tenderness of the limb, and a slight degree of fever; but this has speedily subsided with only this ill consequence, that the wound has failed in becoming united by the first intention, and that the healing of it has been effected afterwards, by the more tedious process of suppuration and granulation. The treatment in these cases is very simple. Cold lotions may be applied in the first instance, for the purpose of moderating the inflammation. When suppuration has begun, the parts may be fomented and poulticed, and the ultimate cure of the small abscess which remains may be promoted by a moderate pressure made with strips of linen spread with soap cerate, applied circularly round the limb.

In two instances the operation has been followed by an attack of erysipelas; but this must be regarded as an accidental occurrence, there having been at the same time several other patients in the hospital, labouring under this disease.

Having made these general observations, I shall not intrude on the patience of the Society, by giving a detailed account of the whole of the cases from which they are drawn. From those of which I have preserved notes, I have, however, selected the four following, the relation of which, will be

sufficient to illustrate the remarks which have been made, and to explain the circumstances connected with this subject, which principally demand the attention of the surgeon.

CASE I.

Mary Narraway, 45 years of age, was first admitted into St. George's Hospital, on the 12th of October, 1814; on account of pain, swelling, and ulcers of the legs, with many large clusters of varicose veins.

October 15. Two clusters of varicose veins which were larger and occasioned more uneasiness than the rest, situated on the posterior part of the calf of the right leg, were divided with the skin over them, by two incisions. There was considerable hæmorrhage, which was stopped by the application of a bandage.

Some inflammation of the skin and cellular membrane took place after the operation, for which she was bled. The wounds made by the operation were not completely healed till after some weeks. She was then affected by an inflammation of the eyes, on account of which she remained in the hospital till the 17th of January. At this time there

was no vestige of the clusters of veins which had been divided, and the veins of the right leg generally were much diminished in size.

She was re-admitted into the hospital on the 31st of January, 1816.

She said that her right leg had been completely relieved by the operation, and that she had no uneasiness in it until three weeks ago; when a small ulcer took place on the inside, a little above the inner ankle.

At the time of her re-admission there was a very painful ulcer of the size of a six-pence, on the inside of the right leg, with some varicose veins above and below the ulcer. The whole of the posterior and outer part of the leg, from the cicatrix downwards, presented no appearance of varicose vessels, and was free from pain; but the pain in the ulcer on the inside was such that she could scarcely bear to stand in the upright position.

In the left leg there were the same clusters of varicose veins which had existed when she was in the hospital formerly, but somewhat increased in size, and a quantity of purple discoloured skin on the inside. She said that she had for a considerable time laboured under a painful varicose ulcer of this leg, which had at last healed under the use of adhesive plaster.

February 10. The cluster of varicose veins above, as well as that below the ulcer of the right leg, were divided in the manner described in the former part of this communication; the skin over them being left entire. The division of the veins occasioned considerable pain, which subsided in about an hour and a half.

February 14. On removing the bandage the ulcer was found perfectly healed. She was free from pain. The wounds made by the operation had healed by the first intention.

March 4. There was still a slight tenderness in the situation of the wounds; otherwise she was free from all uneasiness. There were no remains of the varices, which had been divided.

CASE II.

Anne Sadler, 38 years of age, was admitted into St. George's Hospital on the 21st of August, 1815, on account of varicose veins of the left leg, with a varicose ulcer of the inner ankle. She complained of great pain on the inside of the leg, which tormented her day and night.

On the 17th of September two large varicose veins on the inside of the leg were divided by

means of the bistoury introduced obliquely under the skin. One of these veins was situated about an inch and a half above the inner ankle, and the other about four inches higher, on the inside of the leg.

The wounds made by the operation inflamed so as to suppurate, and afterwards healed by granulation.

In the beginning of October the wounds were completely cicatrized; the ulcer of the inner ankle was skinned over; no vestiges were perceptible of the veins which had been divided. She was free from all uneasiness, except a very slight degree of tenderness in the situation of the wounds made in the operation.

October 9. She was discharged from the hospital as cured.

CASE III.

William Haines, 52 years of age, was admitted into St. George's Hospital on the 6th of January, 1816.

He had two varicose ulcers on the inner ankle of the left leg, one of the size of a shilling, the other smaller. These ulcers had existed for two years, and were exceedingly painful. There was a con-

siderable varicose vein below the ulcer, and another of a larger size above; extending upwards from the ulcers, to join the vena saphæna major. There were two clusters of varicose veins on the calf of the same leg, connected with both the saphæna major and saphæna minor; one of them of a very large size.

The veins of the other leg were varicose in many parts, but there were no ulcers.

January 13. The varicose vein below the ulcers of the left leg was divided in the manner already explained. The large varicose vein extending upwards from the ulcers was divided also, about three inches above the ankle.

The operation occasioned considerable pain, which lasted through the whole night.

January 14. He was more free from pain than he had been for a long time before.

January 18. The compresses and bandages applied at the time of the operation were removed. The ulcers were healed. The wounds made by the bistoury had united by the first intention.

January 19. The larger of the two varicose clusters on the calf of the leg was divided.

January 24. The bandages were removed. The wound made by the last operation had also united by the first intention. The leg was bound up in stripes of linen spread with soap plaster, and a bandage over them.

February 20. He left the hospital. At this time the veins of the right leg were in the same state as at the time of his admission. There were no remains of the veins which had been divided on the left leg: there was no vestige of the ulcers, and the discoloured skin round them had recovered its natural appearance. He was desired to continue the use of the bandage on both legs.

CASE IV.

Patrick Curley, 50 years of age, was admitted into St. George's Hospital on the 17th of January, 1816.

He had a varicose ulcer on each ankle of the left leg, not less than one inch and a half in diameter. There was an extensive cluster of varicose veins on the inside of the leg, above the ulcer of the inner ankle; and a smaller cluster on the outside, above the other ulcer. There was also a cluster of varicose veins on the calf of the leg. He had violent pain in both ulcers.

January 18. The varicose vessels on the inside of the leg were divided in three places, in the same manner as in the last case. The operation occasioned considerable pain, which lasted for four hours.

January 21. On removing the bandages, the incisions made in the operation were found to have healed by the first intention. The ulcers appeared more healthy. They were dressed with strips of adhesive plaster. He did not leave his bed until the 31st of January. He was now free from all uneasiness in the inside of the leg; but had a good deal of pain in the other ulcer.

February 20. The ulcer on the inside of the leg, below the divided veins, was almost completely healed. The ulcer on the outside of the leg was somewhat, but very little smaller. He complained of its being very painful, so as to disturb his rest at night. Three varicose veins were divided above, and one below the ulcer. The pain of the ulcer was immediately relieved, and he slept better on the following night, than for several nights previous.

February 24. He was unfortunately seized with erysipelas affecting the whole of the left leg, and attended with the usual constitutional symptoms. The erysipelas terminated in abscess, the matter of which it was found necessary to evacuate by three punctures in the foot and calf of the leg. When

the erysipelas had subsided, the ulcer on the inside had been completely cicatrized for a considerable time: the ulcer on the outside was nearly cicatrized also. There were no evident remains of the divided varicose vessels.

From the result of the foregoing and of many other cases, I am induced to conclude, that the operation which has been described, may be frequently employed with great advantage to the patient. At the same time I wish to be understood as recommending the adoption of it, not indiscriminately, but with a due attention to the circumstances of each individual case. The cases for which it is fitted, are, not those, in which the veins of the leg generally are varicose, or in which the patient has little or no inconvenience from the complaint, but those in which there is considerable pain referred to a particular varix, or in which hæmorrhage is liable to take place from the giving way of the dilated vessels, or in which they occasion an irritable and obstinate varicose ulcer.

AN ACCOUNT

OF THE

LAST ILLNESS AND DEATH

OF

PROFESSOR

H. BENEDICT DE SAUSSURE.

By LOUIS ODIER, M.D.

PROFESSOR OF MEDICINE IN THE ACADEMY OF GENEVA: ONE OF THE FOREIGN MEMBERS OF THE SOCIETY.

Read Nov. 28, 1815.

THE history of the disease which, in January 1799, prematurely terminated the life of Professor de Saussure, a philosopher whose name will ever be illustrious in the annals of science, contains circumstances, the detail of which has appeared to me worthy of being presented to this learned Society.

De Saussure was endowed by nature with a frame of body bearing every indication of health and strength, and calculated to support a hereditary claim to longevity, which he derived from both his parents, and which seemed, indeed, to belong to the race from which he sprung. He appeared in every way destined to accomplish a long career of glory in the field of scientific discovery, and to

continue to an advanced age a living object of emulation to his cotemporaries in the philosophic world. To me, who have followed the unfortunate series of circumstances which have concurred to frustrate all these hopes, and to bury them in an untimely grave, more properly belongs the task of detailing them to the world, and of cherishing the only consolation that can be now offered to his friends, by shewing that the evil was too deeply rooted to have been within the reach of art, and that, even if its nature had been previously known, the resources of medicine would have been of no avail.

De Saussure had been accustomed, from his earliest childhood, to explore a mountainous country, to bid defiance to the inclemency of the weather, and alike to disregard the extremes of heat and cold; and he had been inured by constant habit to every kind of bodily fatigue. His health had been uniformly good, till the time when he took a voyage to the Boramean Islands, about 30 years ago; on which occasion, having eaten a large quantity of acid fruits, he was seized with a long and serious disorder, which was supposed to have had its seat in the stomach, or in the pancreas, and which rendered him incapable of retaining any species of nourishment. All remedies were ineffectual, excepting Starkey's soap, which was of great service to him. Ever after the period of this illness, he was subject to symptoms of deranged

digestion, was tormented with flatulence, and with so inveterate a disposition to generate acid in the stomach, that although he lived for a great number of years, almost entirely upon meat, and other animal food, and avoided with the greatest care fruit, green vegetables, and acid liquors, he regularly experienced for some hours after dinner every day, a kind of pyrosis or burning sensation, which obliged him to have recourse to chalk, or other absorbents, and to reject by vomiting a great part of what he had eaten. He had fortunately acquired the power of thus emptying the stomach without any particular inconvenience. If he at any time endeavoured to resist this urgent call to vomit, he used to feel a great sense of weight pressing on his stomach, accompanied by strong acidity, and a species of anxiety so oppressive, that nothing could assuage it but immediate vomiting, to which he was always at last obliged to have recourse. In general, however, he did not wait till the distress had attained this degree of severity, and he chose so well his opportunity for relieving himself, that most of his friends, and even his relations, never knew that he was subject to this infirmity. From the age of fifteen, he had been liable to the hæmorrhoids, which occasionally bled profusely. His skin was rough and coarse, the result of an herpetic disposition, which appeared to be constitutional.

Some years ago, he was troubled for the space

of several months, with an affection of the skin on the nose, which beginning with a small pimple, soon degenerated into a malignant ulcer, with hard callous edges; and assumed in process of time so alarming an aspect, that it was deemed absolutely necessary to destroy it by the actual cautery. The operation, which he bore with great courage, succeeded perfectly, and delivered him from his danger. At this period an issue was inserted in his arm, and was kept open ever after.

At the close of the year 1793, after a long continuance of painful exertions in endeavouring to stem the torrent of our political revolutions, and much domestic anxiety, he was suddenly attacked with vertigo, followed by a distinct feeling of numbness in the left arm and leg: a feeling which nothing could ever remove, though the vertigo was not of long duration. It was to no purpose that I had recourse to blistering, purgatives, frictions with flannel, and with mustard; followed by a long catalogue of antispasmodic and tonic remedies. This affection of the limbs appeared to be seated more in the sentient extremities of the nerves, than in the moving fibres. The arm executed with facility every kind of movement, but conveyed no distinct sensation of touch. He felt always as if a quantity of sand were interposed between his fingers and the objects to which he applied them. This sensation was even to a certain degree painful and agonizing; as if the

chief morbid affection of the hand had consisted in an excess of sensibility, so that he was afraid to use it without the protection of a glove. A sensation somewhat analogous to this was also felt in the cheek and the mouth of the same side, which, when he passed his hand across his face, made him sensible of a line of demarcation, very distinctly defined between the right and left side; a sensation which was extremely disagreeable. In other respects he enjoyed good health, and shewed no symptom of plethora, or of debility. He also retained for a long time, his wonted presence of mind, and the full vigour of his intellectual faculties. Many months elapsed without the least change, although this interval was occupied with trials of a multitude of remedies. The cold bath, the hot bath, electricity, arnica, valerian, blistering, embrocations, travelling, hot mineral baths, both artificial and natural, such as those of Aix, Bourbon, and Plombieres; vegetable juices, change of diet, &c. all were ineffectual. The disorder grew worse, but almost always by sudden accessions more or less distinct and severe. One of the most violent of these seizures occurred at the baths of Bourbon, and was brought on by a *douche*, that had been made too hot; and so complete was the attack, that the whole of the left side, from the foot to the tongue, was affected by it. His speech became gradually confused, and almost unintelligible. His legs, especially the left one, were

raised or bent with difficulty. This was most perceptible when he attempted to walk in a straight line, following the junctions in the floor of his apartment, a kind of exercise, in which, from constant practice, he had become very expert, having pursued it with the view of accustoming himself to tread with security on the narrowest ledges of mountains, and borders of precipices. But his disorder had now deprived him of the power of preserving his balance, and his limbs were no longer obedient to the determinations of his will. The most remarkable circumstance, however, attending this state, was that after he had become so infirm as to require the assistance of a stick in walking, it was in going in or out at the door of a room, that he experienced the greatest difficulty. He could cross the room with a tolerably firm step; but the moment he reached the door, although open on both sides, and leaving a space much wider than his body, and without any difference of level in the floor, it was a most arduous undertaking for him to pass through. He tottered, and precipitated his motions, as if he were preparing for the most perilous leap: no sooner was the difficulty surmounted, than he recovered his former confidence, and proceeded with ease across the passage, until he came to another door, when the same unaccountable terrors again assailed him, and the same caution and trouble were requisite to achieve the steps by which the

invisible barrier was to be passed. On his return to Plombieres, he had a copious herpetic eruption on the forehead and about the eyes: it was hoped that this would relieve his other complaints. A similar expectation was entertained from the effects of a hæmorrhoidal colic, which suddenly attacked him; but all these hopes were delusive. The disease continued to gain ground. The only remedy which appeared at all times to exert some power over it, though this was but transient, was blistering; recourse was had to it whenever the headach, or vertigo, to which he had now become very subject, were particularly distressing, and apparently always with relief. About fifteen months ago, I was induced, on the suggestion of Dr. Beddoes, to give a trial to the respiration of an oxygenated air; but before a proper apparatus for this purpose could be procured, he tried the effects of drinking water impregnated with a small quantity of oxygen gas, which his youngest son prepared carefully under his own inspection. I soon, however, advised him to desist, because it appeared to increase the secretion of urine to an immoderate degree; so much so, that it exceeded in quantity the whole amount of the liquor he drank, and aggravated considerably his debility. The roughness of the skin, the swelling of the legs, the proneness to the acid fermentation which had subsisted for such a length of time, his great appetite, and the thirst which he at this time experienced,

gave me a suspicion that he was becoming diabetic, an idea which a recent total change in his diet, tried by the advice of Dr. Tissot, tended to corroborate. As soon as the paralysis had been completely established, the vomitings had entirely ceased, and his food had consisted principally of vegetables and fruits, which no longer produced any inconvenience, and which appeared to have assisted in a remarkable degree the disposition to herpes. These threatenings of diabetes, however, soon vanished: the evaporation of the urine afforded but little extractive matter, but a great deal of saline residue, similar to what is contained in the urine of hysterical persons; and the discontinuance of the use of fruit, and of oxygenated water, were followed by the disappearance of the diabetic symptoms. Some time after this we at length obtained an apparatus for administering super-oxygenated air. It was tried, but could not be breathed without great and fatiguing efforts; and on this account, as well as from its giving no sort of relief, it was abandoned.

The disorder advanced rapidly, though by very insensible gradations; the powers of intellect became impaired; he was hardly able to walk; his features sunk, and his body became more and more bent to the left side. He fell into a sort of apathy, from which he only occasionally revived, and for the moment was able to take a part in

conversation. He laboured for a time under incontinence of urine, and next had a spasmodic contraction in three fingers of the left hand; and then a gangrenous ulcer appeared on the prepuce. From these complicated infirmities he was soon delivered, by a tranquil, and somewhat sudden dissolution. He had supped on the preceding evening with good appetite, but had been restless in the night. In the morning he turned his head on one side, and breathed his last without a struggle.

The body was opened thirty-two hours after death. The dura mater was strongly adhering, particularly along the longitudinal sinus. Between the pia mater and arachnoid coat, we found a considerable effusion of a gelatinous substance, similar to what is often met with in the brain of persons who have died of comatose affections. It had the same bluish tint, peculiar to that substance; excepting that here and there circular spots of a different colour were observed, being of a greyish yellow, and about three or four lines in diameter. They appeared as if encrusted within the membranes, and breaking down into small detached spheres, each of which was surrounded by a small circular border of a blackish red colour. We took these spots, at first sight, for hydatids; but when we attempted to separate them from the membranes, their red margins were found to be blood-

vessels, connected with the other vessels of the head; and contorted, from what cause I know not, into circles. There were no separate pouches, or solution of continuity in the membranes; only in these places they were more transparent than in others, and the serosity which was underneath communicated freely with that which was spread over the whole surface of the brain, being of the same nature and of the same colour, namely yellowish. This colour was apparent in these places on account of the transparency of the membranes, whose opacity in the rest of the surface gave it a bluer tint. From whichever of these places the membranes were opened, the serosity flowed out like water, and we thus collected about two or three table spoonfuls. We heated it by the flame of a candle: there was no coagulation, but a strong ebullition with large bubbles, and the whole fluid evaporated without leaving any sensible residue.

The effusion had taken place, not only on all the surface of the cerebrum, but also on that of the cerebellum, in which latter, it was much more considerable on the right than on the left side. We here and there perceived a few air bubbles, mixed with the blood in some of the blood-vessels.

The ventricles were also entirely filled with the

same kind of serosity, and in such quantity as to dilate them considerably. We estimated that on the whole there was about five ounces. The choroid plexus appeared to be almost entirely composed of clusters of hydatids: an appearance which is indeed very common, depending altogether on the dilatation of the very delicate vessels which form the plexus, and not on detached hydatids. The pineal gland was hard, and crumbled like earth between the fingers; but this is also no uncommon appearance. The examination of the head presented nothing further worthy of notice, except that the brain was a good deal flattened at the temples, and deeply furrowed by the arteries.

The abdomen presented a singular conformation: for when the integuments and peritoneum were opened and turned back, so as to expose the viscera, neither the stomach, the liver, nor the colon could be seen, nothing but small intestines and cæcum presenting themselves. This last was of enormous size. Its circumference measured fifteen inches, while that of the ileum at its termination in the cæcum was not more than four or five inches. The appendix vermiformis was four or five inches long, and adhered by its extremity to the posterior surface of the cæcum. The colon, entirely hid by the small intestines, was also much dilated, and ascended to the right side, over the

liver, to the diaphragm as far as the sixth or seventh rib, then passed to the left side, where it reached as high as the fifth rib, immediately under the nipple, so that in this place it was nearly contiguous to the apex of the heart, being separated from it only by the diaphragm, which it had pushed considerably upwards. Thus the colon, instead of passing as usual below the liver and the stomach, passed above these viscera. It bestrode the stomach at its superior orifice, and compressed it so much the more, as instead of descending as in the natural state on the left side, it passed down obliquely to the right side, so that its sigmoid flexure was contiguous to the cæcum: at length it terminated in the rectum, which was also dilated to such a degree, as to equal the ordinary size of the colon. All the other abdominal viscera were sound. There was no trace of obstruction, hardness, or other morbid affection of the pancreas.

With regard to the viscera of the thorax, the lungs were small, but in other respects healthy, as were also the heart and the large vessels. But as the diaphragm was pushed considerably upwards, so as to admit of very little room for the expansion of the lungs in respiration, if the dimensions of the thorax had been confined within its ordinary limits; this was compensated for by the lungs being extended under the clavicles to some height

along the neck. We had not sufficient time to examine minutely the attachments of the pleura and mediastinum in this singular conformation.

It appears from this examination:

1st. That the proximate cause of the disease and death of Professor De Saussure, was the effusion of a great quantity of serosity in the ventricles, and between the membranes of the brain; which effusion produced a great compression, and consequent injury of the functions of that organ. I presume it had commenced between the membranes of the cerebellum, because it was only in that situation that we found any difference between the right and left sides: and the disease, though general towards its close, had been for a long time confined to the left side, which, as is well known, leads to a presumption that the right side of the brain was the most affected. An effusion similar to the one above described is a very frequent cause of apoplexy, but in general it takes place suddenly, and the disease lasts only a few days. I have lately seen a gentleman of 61 years of age attacked with apoplexy, which proved fatal in sixty hours, whose head presented on dissection exactly the same appearances as in the case of De Saussure, in whom the disease was of five years' duration. It is singular that so great a derangement in the organization of the brain, and existing for so long a period,

should have occasioned so little alteration in the intellectual powers: another singular circumstance is that, with the exception of some transient dimness of sight, the eyes had never been affected; and that the pupil had always contracted readily. The usual consequence of effusion in the ventricles producing the hydrocephalus of children, is a dilatation of the pupil; and it may be understood how in the case of Mr. De Saussure, the disease having increased only very gradually, the optic nerves might have accustomed themselves to a degree of compression, which, had it been sudden, would have affected them; but in the illness of the gentleman above-mentioned, which lasted only three days, no dilatation of the pupil was observed. On what does this difference depend? It will probably be long before this question can be determined. Affections of the brain to all appearance perfectly identical often produce very different effects, and, conversely, effects that are perfectly similar arise frequently from very different morbid affections. In most cases we are equally in the dark with regard to the cause of the effusion. But in this instance we may reasonably attribute it to the cares, the anxieties, and the struggles with which the mind of our illustrious countryman had been harassed by the eventful political revolutions above alluded to. On the other hand, I have learned since his death, that at the beginning of 1793, he had met with a severe fall down a stone staircase, a cause which, it is well known, often lays

the foundation of hydrocephalus; but his son has assured me, that long before this period, his father frequently mistook one word for another, without being conscious of his mistake, so that he was irritated at not being understood, a circumstance which would appear to indicate that his illness should be dated prior to the first attack in 1793. Lastly, it may also be conceived that the displacement of the intestines may, to a certain extent, have compressed the great vessels, and thus have impeded the freedom of circulation in the head.

2nd. If we next consider the state of the abdominal viscera, I may remark that the displacement of the colon, and the compression that it exercised on the superior orifice of the stomach, present a very natural explanation of the habitual vomitings, which the patient experienced some hours after his meals. The extreme dilatation of the large intestines may have been the consequence of the great appetite, which his frequent mountain excursions tended to create; especially as he was in the habit of satisfying it by food that was coarse and calculated to afford a large quantity of fæces, which the exercises he took would tend to accumulate, and to harden in the track of the large intestines. I had long ago been convinced of the dilatation of the rectum, from its producing symptoms of compression on the vesiculæ seminales, which the patient had often mentioned to me, and which I could explain on no other supposition.

This circumstance also, perhaps, contributed to the incontinence of urine, which had tormented him for the last months of his life; but what I certainly could not foresee was, the displacement of the colon. I do not pretend to decide whether this displacement was coeval with birth, or was the gradual effect of dilatation. I am, however, inclined to the latter opinion; and the perfectly healthy state in which we found the pancreas, leads me to think that this organ never had been affected as Dr. Tronchin had believed; and that the symptoms referred to that organ as their seat, were owing to the displacement of the colon, which I presume took place at this period. For these symptoms had continued ever after, although with much less irritation, from the influence of habit; and it is besides difficult to conceive, that a disease of the pancreas so serious as the one which was supposed to exist, should have left no traces behind. I must at the same time acknowledge that an accidental displacement of the colon in this direction, is a phenomenon which I have never witnessed, is unprecedented in the records of medicine, and is apparently in opposition to the natural tendency of the gravity of the contents of this intestine, which would be that of depressing its curvature and of drawing it down towards the pubis, instead of pressing it against the diaphragm. It must, however, be considered that the great muscular strength of De Saussure, and the continual exercise which had become habitual to him, especially that of ascending steep acclivities,

in which the abdominal muscles are in strong action, would contribute powerfully to increase their tension, and would tend to overbalance this effect of gravity, and to force the intestine upwards by the obstacle opposed to its descent.

Lastly, the diminished capacity of the lungs might be supposed to explain the affection of respiration which Mr. De Saussure experienced on very high mountains; but this cannot be admitted as the sole cause, since other philosophers, whose chests were amply capacious, suffered greater inconvenience from the rarefaction of the air at much less considerable elevations. The symptoms which he describes as having felt in these exalted regions, are, besides, nearly the same as those which are stated by the French academicians who ascended the Cordilleras: and there is no likelihood that any similar organic defect existed in them, for I have never seen any other example of the same kind. It is still, however, remarkable that it produced no sensible effect on his habitual state; and there is, perhaps, still more difficulty in understanding how the immense quantity of fæces which must have passed through the colon so near to the heart, had never interfered in the least with its action.

Additional particulars, connected with Professor DE SAUSSURE'S *case; communicated by* DR. MARCET, *M.D. F.R.S. Physician to Guy's Hospital.*

With Dr. Odier's consent, and with the permission of the Society, I take the liberty of introducing here, as connected with the above communication, an interesting case of hemiplegia, the history of which was recorded in consequence of a request of Mr. De Saussure, under the following circumstances.

In April 1797, being a student in Edinburgh, I received a letter from my relation Professor Prevost of Geneva, desiring me, at the request of Mr. De Saussure, to beg of Dr. Black to favour that philosopher, who was then in the last stage of the paralytic attack which terminated his life, with an account of the case of the celebrated historian and professor of moral philosophy, Mr. Ferguson, who, by a particular mode of treatment, was said to have recovered from a similar disorder, under Dr. Black's care. I accordingly waited upon Dr. Black, with Professor Dugald Stewart, who had kindly transmitted to him my request a few days before, and was so obliging also, as to accompany me on this occasion. After a long and interesting conversation, in which the doctor stated to us at full length, and with that peculiar grace and placidity of manner for which he was so remarkable, his opinions con-

cerning palsy, and his persuasion that it was almost in every instance connected with vascular fulness, he delivered to me (for the purpose of being transmitted to Mr. De Saussure, on whose labours and character he expressed himself with the warmest regard) the case I had requested, written in his own hand, just before our interview *.

Professor Ferguson, having, in February last, (1816), suddenly terminated, at the age of 93, his long and useful career, just as Mr. De Saussure's case had been ordered for the press, it naturally occurred to me that a short document affording perhaps the only existing record of Dr. Black's medical practice, and uniting in our recollection such men as the sagacious discoverer of latent heat, the distinguished historian of the Roman Republic, and the intrepid explorer of the Alps, would, independently of its intrinsic curiosity and value, well deserve to occupy a few pages in the Transactions of this Society.

* It is scarcely necessary to add, that the paper was immediately forwarded to Geneva, and that it received all the attention it deserved. I was soon afterwards favoured with a letter from Mr. De Saussure himself, dated 16th of June, in which, after using various expressions of esteem and gratitude towards Dr. Black, he added: "Je désirerois ardemment que les circonstances pussent me permettre de lui faire une visite; je ne doute pas que, comme malade, & comme amateur de géologie, je n'en tirasse de très grands avantages. Je suis entiérement ses conseils rélativement à ma santé, & quoique ils n'augmentent pas mes forces, soit la confiance que j'ai en de tels avis, soit leur bonté, je crois m'en bien

Case of Professor FERGUSON, *drawn up by Dr.* BLACK, *in May*, 1797.

" When this gentleman was first taken ill, he was about 50 years of age; he enjoyed good health and lived freely; for being much beloved by his literary friends, and agreeable in company, he was very often invited to their dinners and parties, where he ate heartily, and drank to the extent of a bottle of wine or a little more, and this very frequently.

" The morning of the day when he was taken ill, he made a fatiguing excursion into the country in very cold and bleak weather, and returned to town just before dinner, very much chilled; he then went to dine with a party of his friends, and eat and drank in his usual manner. He was taken ill a few hours after, with a hemiplegia, and confusion of his head, and perversion of his sight, and a quick full pulse; but his tongue was not affected.

bien trouver." These hopes, however, were but transitory; for, as I learnt soon afterwards, his strength was so rapidly declining at the time he attempted to follow the Pythagorean plan of diet, and he was so much exhausted, that it was almost immediately found indispensable to desist from it; and indeed, the state in which the digestive organs were found, upon inspection after death, sufficiently shewed how impracticable it would have been to have carried into effect any systematic regimen of that kind.

"He was immediately bled and purged, and a very low diet was prescribed for him. Finding himself after this a little better, the bleeding was not repeated, and he only continued the low diet, and got laxatives. By this treatment the symptoms gradually abated, and he was enabled after some months to undertake, though with some difficulty, a journey to Bath, where he used the hot bath in compliance with the general opinion and practice. It produced a copious perspiration, which he perceived by his own feelings, and by its effect on the apparatus of an itinerant electrician who was there at that time, and was often employed to electrify paralytic patients. Whenever Mr. Ferguson, after having bathed, entered the apartment of the electrician, the poor man was astonished to find that all his charges of electricity were suddenly dissipated.

"After remaining a season at Bath, Mr. F. returned to Edinburgh, without having received any evident benefit from the use of those waters, his limbs on one side being still very weak and flaccid. For the rest of his cure he trusted to time and to a strict regimen, and he has not been disappointed; his paralytic symptoms having entirely disappeared, and his health being now so good, in his 73rd year, as to excite admiration. I shall here enumerate the particulars of his regimen.

"1st. Since his disease began, he has had an in-

creased sensibility of the impressions of cold and its noxious effects; a principal object of his attention, therefore, has been to preserve himself from suffering by it. His preservation is an increase of clothing whenever the cold is offensive to him, especially on his legs and feet, in which he felt it the most, and he now wears an uncommon quantity of clothing. He is also very attentive to his bedclothes, and often makes some change in those during the night, by increasing or diminishing the quantity of them, according to his feelings.

" 2ndly. He goes to bed at ten in the evening, and sleeps with his head and shoulders very much elevated above the level of the rest of his body, in which position he sustains himself by having a board across the foot of the bed, to which he can apply his feet.

3rdly. His breakfast is the common breakfast of this country, that is, two or three cups of tea and milk, with bread and butter, to which he commonly adds honey.

4thly. His dinner is a bason of broth or *bouillon* of beef, of mutton, or lamb, with a little barley added to it, or vegetables, or both; and he eats bread with it, and often cabbage that has been well boiled, and he finishes his dinner with a few potatoes or other roots, or sometimes pudding. He never tastes any meat, and he drinks nothing

but pure water. He takes a cup or two of tea, two or three hours after dinner, with bread and butter, but never any thing at supper time. He was directed to the invariable use of this diet by the general advice of his physicians, and by his own experience; for whenever he ventured to use more nourishing and stimulating aliments, he in a short time had a full pulse, and hot uneasy restless nights; and when he suffered from colds, they were more violent, and his recovery was more difficult and slow. For some time after he began to use this diet, he was often flatulent and took a little of ginger or Cayenne pepper to obviate this symptom; but now he has good digestion without need of spices.

"5thly. The only medicines he uses are laxatives, which he is under the necessity of taking very often, or almost every day; and generally two or three grains of aloes answer this purpose.

"When he suffers from cold, his laxatives have much effect in promoting his recovery."

(Signed) "J. B."

"*Edinburgh, 20th of May,* 1797."

During the 19 years that elapsed since the above account was written, making in all a period of about 43 years from his paralytic attack to his decease, Professor Ferguson continued to enjoy a remarkably good state of health till within a few

years before his death, when he became subject to small accidental ailments, which, however, appeared totally unconnected with his former disorder. For the following interesting particulars, respecting his last illness, I am indebted to Dr. Mudie of St. Andrews, the physician who attended him for the last few years, and whose concise, but clear and satisfactory account, I shall make no apology for laying before the Society.

"As it may be interesting to Dr. Marcet," says Dr. Mudie in a letter to Dr. Jackson, "to know every circumstance relative to the case, I think it proper to commence my narrative at the time when I began to be in constant attendance on the venerable professor.—In the year 1810 he came under my almost daily care, and since that period I have never perceived any symptom which would have led me to have suspected that he had ever had an apoplectic or paralytic attack. His mind was almost as entire, as in his younger days; his functions were scarcely impaired with age, if we except his sight; and an occasional intermission in the pulse, which was chiefly to be observed when in his best health; and which almost entirely disappeared during any little febrile complaint.—He was subject to occasional catarrhal affections, during the winter months; but these generally yielded in a few days to a very strict regimen, and confinement to bed.—Since his paralytic attack, till within the last four years, he had never tasted animal food, or

any fermented liquor; soup, fish and vegetables, having formed his diet; but about the year 1812, he began to take a little animal food, and thought his strength was increased by it.—I never knew him in better health and spirits than he was during the last winter; he had escaped his usual catarrh, and his spirits were elevated by the great political events which distinguished the last year.—Late on Tuesday the 20th of February he was attacked with the usual symptoms of fever, and I was sent for about four o'clock in the morning of Wednesday.—I found him very feverish; his pulse (which naturally was about 60) nearly 100; slightly delirious, and he had almost incessant bilious vomiting; his bowels had been irregular for two days, and I hoped that by relieving them his fever would abate.—He got a gentle purgative, and its operation was assisted by an enema.—His vomiting was relieved by the use of the effervescing draughts, and his other symptoms were considerably abated by the free evacuation of his bowels; the fæces were black, and extremely fetid.—He got a little sleep in the course of the next night; but on Thursday I found his febrile symptoms still very alarming; towards the evening of that day he became more composed, and I entertained great hopes that his strength would enable him to support the disease; but these were soon proved to be fallacious, for on Friday his strength appeared to be sinking rapidly, and he finally sunk without a strug-

gle, about four in the afternoon of that day, in the 93rd year of his age. As the disease of which he died, at no time indicated any affection of the head, I did not conceive it necessary to examine the body after death.—If any further information is wished, I shall be most happy to give it, &c."

(Signed) " P. MUDIE."

St. Andrews,
22nd April, 1816.

HISTORY OF A CASE

OF

CHOREA SANCTI VITI,

OCCURRING IN AN ADULT,

AND

CURED IN AN UNUSUAL MANNER.

By MR. KINDER WOOD,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON, AND SURGEON IN OLDHAM.

COMMUNICATED BY

JOHN ABERNETHY, Esq.

Read Jan. 9, 1816.

I AM desirous of laying before the Society the following case of Chorea Sancti Viti, on account of the rare occurrence of this disease in adults, and the scarcity of detailed cases in modern writings or collections *; and because it seems to establish more clearly than has hitherto been done, the dependence of the irregular motions which occur in it, upon a peculiar state of the mind. The authenticity of the case is beyond doubt, it having been seen by hundreds during its progress.

* See cases of periodical jactitation or chorea, by Dr. Watt, in the Fifth Volume of the Medico-Chirurgical Transactions, page 2.

Alice Whitworth, aged 22, married, and residing with her father Samuel Whittaker, a respectable householder at Sarah-moor, near this town, came to my house on the 21st of February, 1815, complaining of severe pains over the right side of the face generally, and darting from the cheek to the temple, gums, and teeth. She is the mother of two children, one of whom, aged 14 months, was at the breast: the menstrual discharge appeared regularly the preceding three months; her employment is such as to expose her to sudden alternations of heat, with cold and moisture. The pains were relieved by an opiate liniment, with liq. ammoniæ, and she went to her work on the two days following.

On February the 24th, at seven in the evening, she complained of a heavy sensation in the eyes, which she had noticed occssionally in the afternoon; and the mother, on examining them, observed that they had a peculiar wildness. An involuntary motion of the eye-lids then commenced, in which they were opened and shut with an excessive rapidity, for about fifteen minutes. This was instantly succeeded by involuntary motions of the right leg and arm, continuing nearly ten minutes. The affection now intermitted about ten minutes, when it commenced in both of the upper and lower extremities with increased violence, and had existed an hour upon my arrival. It continued two hours afterwards; when the pa-

tient became easier, and was put to bed. She had slight motions about twenty minutes, after which she passed a good night.

The motions which I observed upon this visit were the following: the palms of the hands were beat rapidly upon the thighs, and the feet upon the ground; the fore-arms were rubbed incessantly along the thighs; the radius rotating upon the ulna, at the same time that the hand was turned prone and supine during its progress. The arms being at times extended, and the palms of the hands suddenly turned outwards; the back of the wrists were repeatedly and violently struck against each other, while at other times, the middle fingers being extended inwards, struck the palm of the opposite hand, and so alternately with an almost inconceivable quickness. During these different actions of the superior extremities, the feet incessantly beat the ground, and occasionally the eyelids were opened and shut violently. A blister was applied to the neck; a dose of Epsom salts administered; and a saline mixture with ipecacuanha and tinct. opii ordered every three hours.

February 25. The motions commenced about six in the morning, in the arms and legs, and gradually became more violent till eight o'clock, when she arose. They recurred for two hours at a time through the day, with the interval of an hour; and were of the same description as on the 24th, but

more violent. The affection of the eyelids commonly ended in headach, of short duration, with sickness and vomiting. In the evening, the motions extended to the muscles of the trunk and pelvis, when, along with the actions before noticed, the patient was suddenly raised from the chair, but not erect, being instantly reseated; and this took place as quickly as one action could possibly succeed another. The affection ceased at eleven o'clock, when the patient went to bed.

February 26. Slight motions of the limbs came on in bed. She arose at nine o'clock, after which they increased, and became unusually severe. She was hurled from side to side of the couch-chair upon which she sat, for a considerable time, without intermission; was sometimes instantaneously and forcibly thrown upon her feet, when she jumped and stamped violently. She had headach; the eyelids were frequently affected, and she had often a sudden propensity to spring or leap upwards. The affection ceased about eleven o'clock in the forenoon, the patient being very much fatigued; but they returned about noon, and a third time in the afternoon, when she was impelled into every corner of the room, and began to strike the furniture and doors violently with the hand, as she passed near them, the sound of which afforded her great satisfaction. The fourth attack was at night; was very violent, and ended with sickness and vomiting. She went to bed at half-past eleven. Her nights

were invariably good. The three last attacks were more violent than the former ones; but they continued only half an hour each.

The bowels having been briskly opened on the 25th, and no relief yet experienced, I commenced giving four grains of sulphat of zinc, night and morning, four drops of liq. arsenicalis and ten of tinct. opii every three hours.

February 27. The attack commenced in bed, and was violent, but of short duration. When she arose about ten, she had a second attack, continuing an hour, except an interval of five minutes. She now struck the furniture more violently and more repeatedly. Kneeling on one knee, with the hands upon the back, she often sprung up suddenly and struck the top of the room with the palm of the hand. To do this, she rose fifteen inches from the floor, so that the family were under the necessity of drawing all the nails and hooks from the ceiling. She frequently danced upon one leg, holding the other with the hand, and occasionally changing the legs. In the evening, the family observed the blows upon the furniture to be more continuous, and to assume the regular time and measure of a musical air. As a strain or series of strokes was concluded, she ended with a more violent stroke or a more violent spring or jump. Several of her friends also at this time noticed the regular measure of the strokes, and the greater regularity the

disease was assuming; the motions being evidently affected, or in some measure modified by the strokes upon the surrounding bodies. She chiefly struck a small slender door; the top of a chest of drawers; the clock; a table; or a wooden skreen placed near the door. The affection ceased about nine o'clock, when the patient went to bed.

February 28. She arose very well at eight. At half past nine the motions recommenced; they were now of a more pleasant nature; the involuntary actions, instead of possessing their former irregularity and violence, being changed into a measured step over the room, connected with an air, or series of strokes, and she beat upon the adjacent bodies as she passed them. In the commencement of the attack, the lips moved as if words were articulated, but no sound could be distinguished at this period. It was curious indeed, to observe the patient at this time, moving around the room with all the vivacity of the country dance, or the graver step of the minuet; the arms frequently carried, not merely with ease but with elegance. Occasionally, all the steps were so directed, as to place the foot constantly where the stone flags joined to form the floor, particularly when she looked downwards. When she looked upwards, there was an irresistible impulse to spring up to touch little spots or holes in the top of the ceiling; when she looked around, she had a similar propensity to dart the forefinger into little holes in the furniture, &c. One hole in the

wooden-skreen received the point of the forefinger many hundred times, which was suddenly and involuntarily darted into it with an amazing rapidity and precision. There was one particular part of the wall to which she frequently danced, and there placing herself with the back to it, stood two or three minutes. This by the family was called "*the measuring place.*" At noon she had an interval of three hours, when she took six grains of calomel with six of jalap.

. . . . . .

In the afternoon the motions returned, and proceeded much as in the morning. At this time a person present, surprised with the manner in which she beat upon the doors, &c. and thinking he recognized the air, without further ceremony began to sing the tune; the moment this struck her ears, she turned suddenly to the man, and dancing directly up to him, continued doing so till he was out of breath. The man now ceased a short time, when commencing again, he continued till the attack stopped. The night before this, her father had mentioned his wish to procure a drum, associating this dance of his daughter with some ideas of music. The avidity with which she danced to the tune when sung as above stated, confirmed this wish, and accordingly a drum and fife were procured in the evening. After two hours of rest, the motions again reappeared, when the drum and fife began to play the air, to which she had danced before, viz. the "Protestant Boys," a favourite po-

pular air in this neighbourhood. In whatever part of the room she happened to be, she immediately turned and danced up to the drum, and as close as possible to it, and there she danced till she missed the step, when the involuntary motions instantly ceased. The first time, she missed the step in five minutes; but again rose, and danced to the drum two minutes and a half by her father's watch, when, missing the step, the motions instantly ceased. She rose a third time, and missing the step in half a minute, the motions instantly ceased. After this, the drum and fife commenced as the involuntary actions were coming on, and before she rose from her seat; and four times they completely checked the progress of the attack, so that she did not rise upon the floor to dance. At this period, the affection ceased for the evening.

March 1. She arose very well at half-past seven. Upon my visit this morning, the circumstances of the preceding afternoon being stated, it appeared clear to me, that the attacks had been shortened. Slow as I had seen the effects of medicine in the comparatively trifling disease of young females, I was very willing that the family should pursue the experiment, whilst the medical means were continued.

As I wished to see the effect of the instrument over the disease, I was sent for at noon, when I found her dancing to the drum, which she continued to

do for half an hour without missing the step, owing to the slowness of the movement. As I sat counting the pulse, which I found to be 120; in the short interval of an attack, I noticed motions of the lips, previous to the commencement of the dance, and placing my ear near the mouth, I distinguished a tune. After the attack, of which this was the beginning, she informed me, in answer to my inquiry, that there always was a tune dwelling upon her mind, which at times becoming more pressing, irresistibly impelled her to commence the involuntary motions. The motions ceased at four o'clock.

At half past seven the motions commenced again, when I was sent for. There were two drummers present, and an unbraced drum was beaten till the other was braced. She danced regularly to the unbraced drum, but the moment the other commenced she instantly ceased. As missing the time stopped the affections, I wished the measure to be changed during the dance, which stopped the attack. It also ceased upon increasing the rapidity of the beat, till she could no longer keep time; and it was truly surprising to see the rapidity and violence of the muscular exertion, in order to keep time with the increasing movement of the instrument. Five times I saw her sit down the same evening, at the instant that she was unable to keep the measure; and in consequence of this I desired the drummers to beat one continued roll, instead

of a regular movement. She arose and danced five minutes, when both drums beat a continued roll; the motions instantly stopped, and the patient sat down. In a few minutes the motions commencing again, she was suffered to dance five minutes, when the drums again began to roll, the effect of which was instantaneous; the motions ceased, and the patient sat down. In a few minutes the same was repeated with the same effect. It appeared certain that the attacks could now be stopped in an instant, and I was desirous of arresting them entirely, and breaking the chain of irregular associations which constituted the disease. As the motions at this period always commenced in the fingers, and propagated themselves along the upper extremities to the trunk; I desired the drummers, when the patient arose to dance, to watch the commencement of the attack, and roll the drums before she arose from the chair. Six times successively, the patient was hindered from rising, by attending to the commencement of the affection; and before leaving the house, I desired the family to attend to the commencement of the attacks, and use the drum early.

March 2. She arose at seven o'clock, and the motions commenced at ten; she danced twice before the drummer was prepared, after which she attempted to dance again four several times; but one roll of a well-braced drum hindered the patient from leaving her seat; after which the attacks

did not recur. She was left weakly and fatigued by the disease, but with a good appetite. In the evening of this day, an eruption appeared, particularly about the elbows, in diffused patches of a bright red colour, which went off on the third day. On March 4th she had the menses in her usual way; and on the 8th, was free from complaint. The bowels regular, urinary secretion natural, the appetite good, and strength improving.

During the existence of this disease, and for two days after its cessation, there was a frequent sensation, particularly when in bed, of insects creeping in circles over the skin, especially upon the thighs.

The alvine discharge during the complaint, and especially after the use of opening medicines, was occasionally offensive, unnatural in colour, and slimy; but at other times it was perfectly natural.

The pulse I never found under 108, but frequently 130 after the cessation of the attack, when she was always fatigued, and had a tendency to doze and sleep. Twice since, she has had slight affections in the eyelids, which have gone away without further trouble. The child was early taken away from the breast, suspecting this affection might have some connection with the secretion of milk; and in advising this, I had also a

view to the use of cold affusion, but the sudden cure rendered this unnecessary. The milk receded favourably.

This woman, previously to her complaint, could never dance, even a country dance; and yet I saw her execute steps which could not be taught without difficulty. At times she would rise upon the toes, and move forward, alternately advancing each heel into the hollow of the opposite foot; at other times, poising the body upon one foot, with the heel raised, she would beat time with the toe and heel of the other.

In this case there was no wandering of the intellect, either during the paroxysm, or in its absence. The perception and judgment were accurate and just, and all questions were answered correctly. During the intermission, she did many household affairs, nursed her child, &c. &c. although the troublesome curiosity of her numberless visitors undoubtedly disturbed her ease. There was a constant wish to recover; a just knowledge of her situation, and of the advantage she received from the agency of the instrument, with an anxious desire to continue its use.

How far the mind was in a state of excitement in the commencement of this disease it is difficult to decide, since the connection betwixt the involuntary ideas and the involuntary motions was only

observed on the 27th of February. After the dancing commenced, I noticed the patient always to be in good spirits, evidently to enjoy the drum, and to turn to it instantly, upon the very first stroke, in whatever situation the involuntary motions had then carried her.

This disease appears to have consisted in an highly irritable state of the mind, with which the organs of voluntary motion became associated; and the cure was effected by interrupting this irregular association. It is probable that the noise of the instrument in a room scarcely six yards square, was very advantageous, by interrupting the chain of musical ideas, impressed upon the highly excited mind, and re establishing the ordinary relation of the mental operations with external things. The voluntary muscles also early associated themselves with the instrument, as was shewn by the instant cessation of their unnatural actions, when the time could no longer be kept.

The involuntary actions became more frequent, as their duration was shortened by the means put in force; so that it would seem as if the disease struggled to renew actions which had not been permitted to arrive at an ordinary period.

Some circumstances having prevented my forwarding to the Society the above case, the delay has given me an opportunity of accompanying the report by some further statements. As no attacks of the affection had occurred for nearly five weeks, I had considered the disease as cured. On the 10th of April, however, the patient again applied to me, and stated that on the 4th of April, slight motions appeared in the face; on the 6th, she was prevailed upon to receive several electric shocks; on the 7th she was worse; on the 8th she was easier; but on the 10th she was much worse; the motions affecting the eyes and eyelids, and muscles of the face. Since the former attack, the bowels have been constantly kept open by the use of laxative remedies; but the menses have not appeared at the usual period. I found no particular excitement of the mind; the pulse was 90 and weak; she complained of weakness and lassitude, and as she returned home from my house the affection attacked the right arm. A powder of the hydrargyri submurias, with pulv. rhei, opened the bowels thrice in the afternoon, and the discharge was dark-coloured, slimy and offensive. Fifteen grains of bark were also ordered three times a day.

April 11th. She shewed me an eruption near the elbow, which had appeared about the time the motions recommenced. This day the motions affected the eyes, eyelids, and face generally, and the muscles of the right fore-arm and fingers were

also singularly affected. The stomach was flatulent, with frequent eructations; she was low-spirited, languid, and heavy: the pulse was 108 and feeble; she has had three more passages, dark, offensive, and slimy; and the affection was evidently increasing. The purgative was repeated, and fifteen grains of bark, with two grains of rhubarb, given three times a day; and at night four grains of the pil. hydrargyri.

12th. Before rising she had considerable motions in the eyelids, and in the arm and fore-arm; but very little in the course of the day. Had two loose and offensive stools; the urine is high-coloured; the eruption receding. The medicines were repeated.

13th. Has had several dark, offensive, and slimy evacuations; no irregular motions, and the appetite improving. The medicines were continued.

14th. Has had no irregular motions of the muscles; is very sleepy; complains of pains shooting along the right side of the face, teeth, and gums, similar to those which preceded the affection; the eruption keeps out slightly about the elbow. Has had several more natural evacuations. The medicines were continued.

15th. Has had no irregular motions of the mus-

cles; appetite good; not dull or sleepy; the pains continue, and she has had several relaxed, but more natural evacuations.

April 16. Has had some slight affection of the eyelids, brought on by a fright; pulse 120; tongue light yellow, moist and soft; appetite improving; eructations diminishing. Has had two loose evacuations of a natural appearance. The bark, &c. was continued; an opening powder ordered every second morning, and the pil. hydrarg. every second night.

17th. The evacuations were light coloured, not offensive nor slimy; no irregular motions.

18th. Bowels relaxed; no irregular motions; continue the bark without the pulv. rhei.

19th. Feels languid; eructates frequently; has had three relaxed evacuations of a natural appearance, and has had some affections in the eyelids. The bark was continued three times a day, with opii gr. ss. castor gr. iij. and camphor gr. ij. The mercurial pill was omitted.

20th. Had a very good day.

21st. Two evacuations, relaxed, but natural in other respects; affections of the eyelids

troublesome in the afternoon; appetite and strength improving. The powders were continued.

22nd. No evacuation from the bowels; tongue moist, with a light yellow fur; pulse 90; slight motions in the eyelids. The powders were continued, and a purgative ordered every second morning, of hydr. submur., pulv. rhei, and pulv. jalapii, each gr. iv.

From this period till May 27, the patient continued very well, except having occasionally slight twitchings in the eyelids. On that day the affection six times attacked the legs and arms, precisely as in the first attack; and it was preceded by violent retching, and motions at the scrobiculus cordis, which I consider to have been similar affections, situated on the muscular coat of the stomach.

On the 28th she had six similar attacks, when the family again resorted to the use of the drum, by which she was four times instantaneously relieved. The attacks had ceased before I saw the patient, which was in the evening. I found the bowels slow; the pulse 100 and weak, and the patient stated that she thought herself in the third month of pregnancy.

May 29th. The irregular motions were confined to the eyes and eyelids, and attended with a sense of fulness and anxiety in the chest.

30th. This day when the affection was in the eyes and eyelids, the patient beat the drum herself, with instant relief of the symptoms; and upon their recurrence, she again resorted to the drum, but without relief. The drum was then taken by a young man working in the house, who instantly stopped the motions by beating violently. This day the drum stopped the motions of the eyes and eyelids four times.

31st. The motions of the eyes and eyelids were stopt thrice; twice by the patient beating the drum, and once by her brother.

She continued well from this day to the 5th of June, when the affections attacked the muscles of the abdomen, and muscular coat of the stomach, producing considerable movements in the abdominal parietes, and an exhausting retching. The attack ending in a bilious vomiting. On the 7th the attack was extended to the muscles of the back of the neck. The head was drawn back so powerfully, that the extension of the larynx made the patient breathe with extreme difficulty, and with a loud and croupy noise. The eyes, mouth, and face were also much distorted, and when laid down upon her side, she was frequently, gently, but involuntarily, turned upon her back; on the 11th she danced six times, frequently turning swiftly round for five minutes together, and the movement going off with a vomiting of bile. On the 12th

she also danced frequently, but the dance had nothing of the regularity which characterized it in the commencement, but consisted of irregular involuntary motions often ending with vomiting.

On the 8th a blister was applied to the head, which she thought eased her during its operation; and on the 13th she took a vomit, with relief for the day, which was repeated on the 15th without any benefit. On the 13th, 14th and 15th, the motions diminished, and were succeeded by excruciating pain in the face, and on the 16th three leeches were applied to the face with relief. On the 17th I took eight ounces of blood from the arm, which eased the pain. On the 18th she felt feeble and weak, had motions only in the eyelids and left arm slightly; the bowels were open, and stools dark coloured. On the 19th the affections attacked the muscles of the arms, of the abdomen, and of the throat, attended with great difficulty of breathing; the bowels being open. On the 20th she passed a very good day. 21st. Had some affections in the muscles of the chest, producing difficult breathing, and also in the eyes and eyelids, for which I took eight ounces more of blood, with great relief. I was chiefly induced to bleed from the arm, upon considering the pregnant situation of the patient, and as she found relief, I was inclined to extend the use of the lancet. The patient continued very well till the 9th of July, when some involuntary motions again appearing, and increasing to the

11th, eight ounces of blood were taken from the arm, with perfect relief. She continued very well till the 2nd of August, and on the occurrence of some slight involuntary motions again appearing, I bled her from the arm largely, since which time she has been perfectly free from complaint. After the affections attacked the neck, on the 7th of June, the drum had never any effect in shortening the duration of the attacks. The patient is now in very good spirits and health.

PARTICULARS

CONCERNING THE

STRUCTURE

OF A

MONSTROUS FŒTUS.

By MR. MAUNOIR,

PROFESSOR OF SURGERY AT GENEVA.

COMMUNICATED BY

DR. MARCET.

Read Jan. 23, 1816.

NO great effort of imagination is required to conceive the possibility of the union of twins so as to compose only one body. The cause of such a phænomenon, indeed, is capable of explanation in a manner sufficiently plausible, and no astonishment is now excited by the view of two fœtuses which have grown together in the same uterus, connected intimately by the back, abdomen, or chest; nor even by their forming a single trunk, out of which spring two heads, four superior, and also four inferior extremities. Such irregularities are so frequent, that no particular interest can now attach to them.

But the occurrence of a double fœtus, of which the formation cannot be accounted for, unless by

supposing each to have undergone some great mutilation prior to the period at which they were united; and the union of the dismembered parts to have taken place at random, is a phænomenon which hitherto stands alone in the history of monsters. Its explanation, if not impossible, is, at least, extremely difficult; but if obtained, would probably throw new light on the mysterious process of conception.

In the monster, of which I have the honour of transmitting a description and drawing to the Society, this curious and unprecedented combination of circumstances is found to be realized. It was born of a young woman of between 16 and 17 years of age, at the beginning of the present year (1815), and lived for a few minutes. The labour presented no particular difficulty; the perfect head was born the last. In order to obtain a correct idea of the form of this singular being, we must imagine two female fœtuses, each divided transversely into two portions; the one containing the greater part of the trunk, the head, and pectoral extremities, and the other consisting of the pelvis and the pelvic extremities. We must then suppose the operation of some blind power tending to repair this injury, and to reunite all the parts that had been separated; but which, instead of bringing each portion in contact with the corresponding part from which it had been divided, had united the trunk of the one with the trunk of

the other, and the pelvis of the one with the pelvis of the other; so as to form on the one hand, an individual composed of a very irregular kind of trunk, with two heads and four pectoral extremities: and on the other a being consisting of two pelves, and four pelvic extremities. Lastly, we must conceive this latter being united to the former by being placed transversely upon it on its back, just as a sack of corn is laid on the back of a mule. This statement may serve to convey a general idea of the singular conformation of this monster; a few corrections are, however, required to render it exact.

One of the heads of this double fœtus is perfect; the other is more than imperfect; for in the place which it ought to have occupied, the rudiments of the cranium and face only are met with. A rapid anatomical sketch of the viscera of the abdomen, will, by reference to the drawing, give a sufficiently complete notion of this extraordinary fœtus.

The perfect head may be designated as the superior one; the inferior one being that of which only a few rudiments are found. There is only one circulating system, that is, only one heart, and one set of respiratory organs, both occupying the superior thorax, which, indeed, appears to be perfectly formed; the other thorax is completely

wanting. An enormous liver covers the whole of the intestinal mass, and appears through a pellicle or transparent membrane, between the laminæ of which, a single umbilical cord passes in a serpentine course, and enters into the liver. There are therefore no anterior muscular abdominal parietes. The liver, the membranes, and the cord, have unfortunately been removed.

The inferior head, such as it is shewn in the figure, had a large bladder growing upon it, filled with a clot of blood; it had been removed, from an idea that it was of no importance.

There is only one complete system of digesting organs on one side, while on the other are found two intestinal appendices quite anomalous in their structure, and communicating with the former: that is, the complete canal commences from the mouth of the perfect head, and is regularly continued to the anus of the right side; but when it has attained the middle of its length, the ileum gives out a branch of intestine which proceeds till it terminates in a kind of cloaca, or cavity, corresponding to the inferior head, and constituting the whole of its cavity. Two inches farther this ileum bifurcates, in order to form on each side two cœcums, each of which are continued into a colon and a rectum. The rectum on the right side opens by the only anus, which is met with

in this monster; the left rectum, which was prodigiously distended with meconium, terminates by an imperforate bag near the fundus of the left uterus.

On opening the cloaca, it was found to contain the rudiments of a lower jaw, and of a tongue, which were immersed in the meconium with which this cavity was filled. The left uterus, on which the left rectum reposed, is fully developed, and its bulk is at least double that of the right. The organs of generation appear to be complete. A urinary bladder is found on each side. There are two kidneys, which, by their size, appear formed by the union of four kidneys. The left has two ureters, the right only one.

It will appear from this description, that the cavities of the two pelves, opposed to each other, form the lateral parts of the common abdomen, and occupy its lumbar regions. At the top of the inferior head, and a little to the right, a hole is observable, over which the bladder, that had been cut off, was placed. This imperfect head presents an appearance of scalp covered with hair, and a cartilaginous body of an irregular form, which appears to be the rudiment of an external ear. The circulatory system has not been injected.

Geneva, August 21, 1815.

Note by the Secretaries.

Mr. Maunoir was so kind and liberal as to send to the Society the fœtus, described in the preceding narrative, the dissection of which he had not carried so far as he might have wished, being desirous of sending the preparation in a good state of preservation. Having been examined, immediately after its arrival, by Dr. Marcet, Dr. Roget, and Mr. Lawrence, it was placed on the table of the Society for the inspection of members, and then presented to the Royal College of Surgeons, that it might be deposited in their Museum.

In the examination made by the gentlemen above-mentioned, they found the general configuration of the creature, and its internal structure in all the points noticed by Mr. Maunoir, to correspond accurately with his description. They were enabled however, by a little more dissection, to ascertain the following further particulars.

The aorta, produced from the heart, contained in the chest of the superior or more perfect child, having passed the diaphragm, divided into three branches for the supply of the inferior or less perfect trunk, and of the two lower halves. The left of these three arteries was much the largest; it produced the iliac vessels of the left pelvis and lower limbs, and was then continued to form a large umbilical artery, the only one which this double child possessed. The right branch supplied the right pelvis and lower limbs. The middle one ran along the spine of the inferior child, and divided into two vessels, which might be called arteriæ innominatæ; for each of them produced a small carotid running along the imperfect inferior stump of a neck, and a subclavian artery, which went to the corresponding upper limb of the inferior child.

On dividing the integuments of the back, at the part where the upper and lower halves of the creature were united crosswise,

the two vertebral columns were seen to end abruptly opposite to each other, and the two pelves had the bases of their sacra turned towards each other. But there was a considerable interval between the extremities of the spines and the sacra, occupied by a firm membrane. When the latter was divided, the medulla spinalis was seen running across from one spine to the other, and distributing its branches laterally to the two lower halves; so that the two trunks had a single spinal marrow, and each of the pelves, with its two lower limbs, received its nerves from one side of this single organ.

This arrangement of parts was quite new to the gentlemen who made the examination, and appeared to them so singular, that they had a drawing made of it, represented in Fig. 3, Plate III. which will make the subject much more clear than any description.

HISTORY

OF

A CASE

OF

CÆSAREAN OPERATION.

By KINDER WOOD, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON, AND SURGEON IN OLDHAM;

COMMUNICATED BY

JOHN ABERNETHY, Esq.

Read Dec. 26, 1815.

PRACTITIONERS in midwifery are occasionally placed in the painful and unfortunate predicament of being obliged to have recourse to the cæsarean section, an operation, which, in this kingdom, has hitherto proved invariably fatal. The state of practice which regards this operation, is so unsettled, that the faithful detail of fatal cases, provided the necessity of the measure be established, will not only stand as precedents, and as grounds of justification to future operators; but will, sooner or later, form a body of materials, from whence we may reason, and which, by elucidating the causes of the fatality, may ultimately contribute to more

successful events. On these accounts I have taken the liberty of laying the following case before the Society.

On Friday the 19th of August 1814, a man came in haste to my house, to desire that I would go down and see the wife of James Tinker, of Whitegate-end, in Moston, about three miles distant. He desired me to take instruments down, as she had been in labour some time. I arrived at ten o'clock in the forenoon, and found a medical man from the neighbourhood of Newton Heath, who had been in attendance from Thursday morning early. I learnt that he had not been able by a common examination to ascertain the state of the presentation, or even of the os uteri, these lying completely above the superior aperture, which he discovered to be excessively distorted. As the pains continued, the membranes pushed into the superior aperture, in a conical form, and the liquor amnii came away at seven in the morning of the 18th. The pains had been very strong at times, and as no part of the child had descended into the superior aperture, the hand had been very frequently passed through the os externum, with the view of ascertaining the progress of the labour. The urine had been voided freely during the 18th, but scantily since the evening of that day. The bowels were costive.

I found the patient lying upon her back in bed,

unable to turn herself, and scarcely able to move, from previous malacosteon and soreness, the consequence of her situation. She had borne five living children; was 34 years of age; a weaver; and this was her sixth labour. In the last two months of her third pregnancy she was very lame. She laboured under phlegmatia dolens after her fifth labour, and walked lame ever since, projecting the right side more particularly in her gait. She had been in the Manchester Infirmary ten weeks previous to her last pregnancy, without receiving any relief; and for the last five months had kept her bed. The pulse at this time was frequent and weak; the tongue moist and soft, having a clay-coloured deposit upon it; there was no headache. but occasionally a long continued cold fit, with shivering succeeded by heat. She spoke cheerfully.

Upon making a common examination, I could touch no part of the child or os uteri; there was an unpleasant cadaverous smell, arising from the state of the soft parts which were much enlarged, hard, and livid, particularly the right pudendum, extending along the perineum to the anus. Necessity alone could induce me to further examination in such a state of the external organs; and the patient being gently placed upon her left side, after oiling the hand and arm, I proceeded as easily as possible to pass the hand. The commencement of that dilatation of the os externum which was neces-

sary, although much more easy than I had ever noticed before, owing to the hand having been passed so repeatedly before my arrival, produced a convulsive action of the stomach, which lifted its contents into the mouth. At this time there were no labour pains. The approximation of the rami and bodies of the ischia made it necessary to pass the hand far backwards, in order to introduce the arm freely, which was unavoidable in order to examine the superior aperture carefully; but this diminution of the inferior aperture would not have been any objection to the use of the crotchet. It was at the superior aperture the great mischief was discovered; for here, the diminution was so great, as to render it impossible to pass more than one finger above the aperture. The greatest space, or that part where the greatest circle might be described, was from the projecting bodies of the lowest lumbar vertebræ, and base of the sacrum to the pelvis. This part was very much straightened by the bodies of the pubes turning outwards suddenly to meet at the symphysis, and thus projecting towards the sacrum two angular protuberances. Into this space, three fingers crowded upon each other, had their points received, but became immediately wedged fast, one finger alone could be passed through, so as to gain some information respecting the presentation, and state of the os uteri. From the projection of the body of the last lumbar vertebra and sacrum, to the symphysis pubis, was the longest an-

tero-postero diameter, which I thought an inch and a half; but a considerable portion of this space was rendered useless with respect to delivery, from its being bounded on each side by the bodies of the pubes, as they turned outwards before uniting at the symphysis. What may be termed the real and available aperture, was that part where the greatest circle could be described as stated above, and the diameter of this circle was, as near as I could judge, about one inch. This opinion I drew from its only being capable of receiving the points of the three fingers crowded close, which being soft, yielding, and irregular in shape, must necessarily in part lie within the approximating bodies of the pubes. Upon examining to the left of this aperture, I found the body of the pubis approaching so close to the projecting sacrum and vertebra; that it was not possible to pass the ring-finger edgewise, betwixt the approximating bones. Upon trial, I find I can pass the same finger edgewise through a space three-eighths of an inch wide, and very readily through a space half an inch; hence I concluded the space here to be less than three-eighths of an inch. Upon examining to the right of the greatest space, the fore-finger edgewise passed easily, but touching the approximating bones, so that I concluded the space here to be rather more than half an inch. It will be seen by this statement, that I was examining with the right hand, and with the back of it to the pubis, and the palm to the sacrum.

After withdrawing the right hand, I passed the left, in order to be more certain; and now by passing the fore finger as high as possible, I ascertained the foot to lie upon the superior aperture, but not within it. The os uteri I could never touch, from which I concluded the dilatation to be far advanced.

The opinions I had formed of the state of the pelvis, during this examination, induced me decidedly to decline any thoughts of using the crotchet, to which I was urged, and after explaining myself upon the practice I thought adviseable, and recommending an enema to be immediately injected, I rode home with the view of preparing for the cæsarean section.

Having called upon my friend Mr. Halkyard, and stated my views of the case, he was so kind as to accompany me to the patient. Mr. Halkyard made a very careful examination of the distortion, by passing both arms in succession, during which he touched a hand. This proved to me, that there was both an upper and lower extremity presenting, which is not an unusual preternatural case. Mr. Halkyard perfectly coincided with my opinion as to the absolute impossibility of delivering with the crotchet, and the necessity of resorting to the operation of hysterotomy.

The husband and friends being apprised of the

impossibility of delivery through the natural passages, willingly submitted to whatever was thought necessary, as did the patient, who was cheerful and resolute. At this time, a shivering came on, which continued half an hour; the pulse became frequent and weak, and the patient complained much of cold. A little warm wine was given, and, as the heat returned, the patient was gently placed upon her back, and the abdomen exposed. The part of the abdomen where the uterus and its contents were the most prominent was chosen, and it was proposed to tie the epigastric artery, if it should be cut.

An incision was made through the integuments, in a straight line, an inch to the right of the umbilicus, commencing three inches above, and terminating three inches below it, directly in the linea alba. As there was no fat in the adipose membrane, this incision exposed the peritoneum, with the tendinous fibres of the linea alba, scattered loose over it, rather than forming a compact tendinous expansion. An opening was carefully made with the knife, at the termination of the incision into the cavity of the abdomen, through which passing the finger, the incision was enlarged with a pair of curved scissors, at once, to the top. The uterus was now fairly in view, and no intestine protruding. The knife being now resumed, an incision was commenced into the substance of the uterus beginning at its fundus, and extending longitudi-

nally downwards, and corresponding in size and direction to the external opening. At the bottom of this incision, the cavity of the uterus was penetrated so as to receive the finger, upon which one blade of the curved scissors being introduced, the uterus was laid open from below upwards. At the fundus a small portion of the placenta was detached, as the scissors were insinuated betwixt it and the womb. I now passed the right hand into the groin of the child, and extracted it gently through the womb, whilst Mr. Halkyard supported the abdomen, by placing the extended hand upon each side of the incision. Unhappily the child, the object of my hopes, was dead.

I now cut the funis, and wrapping it around the fingers of the right hand, passed the left into the uterus, and detached and brought away the placenta, which was attached to its fundus. The moment the placenta was extracted, the uterus contracted powerfully, and hiding itself in the belly the wound was instantly filled with intestine and omentum. These were easily reduced and retained with the extended palm, whilst Mr. Halkyard passed six stitches through the integuments, and secured the wound with slips of adhesive plaster. Pledgets of the ung. ceræ were also applied, and the whole secured with a wide bandage, pinned easily round the belly. The quantity of blood lost did not exceed two ounces; no vessel spouting;

and the hæmorrhage, even after the detachment of the placenta, was unusually slight, owing to the rapid contraction of the womb.

The patient was placed in bed as comfortable as her situation would allow; she was thankful for her delivery, and spoke confidently of recovery. The hopes of any favorable termination, were however not to be entertained; and the loss of the child was peculiarly unhappy. The child was fresh, and it had not been dead long, as the mother felt its motions in the course of the night. The pulse was so low as to require a repetition of the cordial; but it rose in strength before I left the house. Previous to the operation the enema had procured a copious evacuation; the catheter was also introduced with great difficulty, but no urine found in the bladder.

The patient was much recruited at seven o'clock, five hours after the operation; but died at twelve o'clock at night, ten hours posterior to the delivery.

I went down to see her at five the morning after, and met a message coming to inform me of the result; I however rode forward with the view of inspecting the contents of the abdomen. Having cut away the stitches, and enlarged the incision, I found the uterus contracted to the ordinary size

after delivery; the opening into it measured only three inches. The edges of the wound looked like a fresh incision; its substance bore no marks of injury, either from the operation or the labour; the peritoneal coat was red and inflamed; the bladder was contracted, empty, and uninjured. The peritoneum was universally and uniformly red, and very much inflamed, more particularly the peritoneal coat of the intestines. A small quantity of bloody serum was effused within the cavity of the belly, and the external organs of generation were in a semigangrenous state. This inspection gave me an opportunity of confirming my opinions of the degree of distortion, by an examination of the pelvis from above, and satisfied me of the correctness of the opinion formed from the examination *per vaginam*. This inspection being made when I was unprepared for taking away the pelvis, and being in some measure clandestine, as I had only permission to examine the wound, I was necessarily confined to a view of the most prominent seat of disease and injury. I went down in the afternoon, with the view of procuring a more extensive examination, but the permission was declined.

The result of this inspection shewed, that the substance of the uterus had received little injury, and that the patient died of extensive inflammation of the peritoneum, the rapidity of which ter-

mination was undoubtedly hastened by the injury the external organs had received; and this in a debilitated system labouring under malacosteon.

In this case, the state of the external organs must undoubtedly be attributed to the frequent examinations made previous to my arrival: and these examinations, since they consisted in the introduction of the whole hand, so were they more injurious in their effects, than the simple examination made in an ordinary protracted labour. Whoever has been in the habit of examining a distorted superior aperture, will know, that this cannot be accurately done without an introduction of the whole hand: but the hand can never be frequently introduced into the vagina, without exciting great irritation and inflammation of the part, in which the whole pelvic organs become involved, and which is very easily extended to the abdominal viscera. As this operation ought to have its necessity ascertained, not by waiting till the fruitless efforts of the patient have produced exhaustion, but by a cool deliberation upon the degree of the distortion: so in cases of extreme deformity, there is not in fact any reason why a first examination, if made slowly and carefully, should not be sufficient to justify us in calling a consultation, and stating an opinion, rather than the repeating examinations which must necessarily induce a state of the parts incompatible with life.

It is necessary in this unhappy case, that the first examination should be made so carefully as to do away with repetitions as much as possible. By making this a general rule, we should in a great measure obviate the dangers of inflammation, as well as of too great a debility, which are the two sources of the fatality of the operation in this kingdom. We should thus come to an earlier operation, a circumstance upon which all our hopes of saving the mother must depend.

But it is not alone to the mother, that an early operation holds out its advantages, for labour is always dangerous to the child, if long protracted after the rupture of the membranes, even in a well formed pelvis; and in this case of an extreme distortion, the danger is much increased.

I would not here be understood to advocate a hasty or rash operation. It is to a decided and early conduct, founded upon a careful examination, that I would press. I have known a patient labouring under malacosteon, and absolutely confined to her bed, years previous to her pregnancy; and when labour came on, a gentleman of very large practice sat several days beside the bed without proposing any thing. As the strength of the patient began to fail, the head was opened with difficulty, but could not be brought down. When the patient was in a state of dissolution, a consultation was desired with a view to the operation of

hysterotomy; but the patient expired before other advice could arrive. In this case the distortion was so great, that the short ribs were received within the alæ or wings of the ossa innominata, and the head was so sunk and carried forwards, that the shoulders were nearly upon a line with the vertex. Such cases exhibit a culpable indecision, and shew that it is not the frequency of the examination, but the carefulness of it that entitles to confidence.

Before concluding these remarks, I should wish to allude to the advantages arising from the use of the curved scissors in this operation. After the common integuments have been divided, and an opening made at the bottom of the wound into the abdomen, the curved scissors will complete the exposure of the womb much quicker than the knife or the curved bistoury. The same may be said of completing the wound into the uterus; and so admirably calculated are they for this part of the operation, that it is surprising they should ever have been laid aside for the knife. In the exposure of such large cavities as those of the abdomen and uterus at the same time, it is of the greatest consequence that the incisions should be made as quickly as is consistent with safety.

There is also another observation I wish to make: when the abdomen was laid open, and the uterus exposed, the most prominent appearance was an incessant rolling of that organ, even during the in-

cision, which required the hand to be placed firmly upon it whilst the knife was carried from above downwards. This rolling of the womb I have not seen noticed in any accounts of other operations. There was nothing like a contraction of the womb nor labour pain during the operation, nor till the placenta was withdrawn. But then the womb contracted vigorously and instantaneously, burying itself amongst the intestines which rushed into the wound. This rolling of the womb seems to have been occasioned by feeble and irregular contractions of its muscular fibres, resulting from that state of atony or exhaustion in which there is not strength sufficient to produce a true labour pain. I have often noticed such a circumstance upon applying the hand to the abdomen of weakly women, after the expulsion of the child, and previous to the extraction of the placenta.

ON THE

LACERATION

OF THE

FIBRES OF MUSCLES,

PARTICULARLY OF THE

EXTERNAL GASTROCNEMIUS.

By JAMES WARDROP, Esq. F.R.S. Ed.

Read May 23, 1815.

THERE is an accident to which the muscles are occasionally liable, and though not unknown to some surgeons, I am not aware has ever been noticed by surgical writers. As I have observed a few instances of it, perhaps a short account of them may not be deemed unworthy of being laid before the Society.

It sometimes happens that muscles during violent action tear asunder their tendons, and they have been known to break through the bones to which they are attached. In the injury now to be described, only a few of the muscular fibres are torn, and as far as I have been able to observe, the

laceration is most apt to take place near the part where the muscle becomes tendinous. This description of injury is not confined to any particular muscles; it is an accident by no means unfrequent, and it appears to me that many of those anomalous injuries of muscles, and injuries which have been often attributed to the lacerations of tendons, as of the plantaris longus, are of this description.

Perhaps there is no muscle so liable to this injury as the external gastrocnemius, and it can occur in few where the symptoms are so strongly marked, or where a proper treatment is of such importance; the limits of this paper will therefore be confined to a description of the injury of this muscle.

When any of the fibres of the external gastrocnemius are torn, it will always be found to be the consequence of some untoward or sudden action of the muscle; and the attention of the patient is called to it, by suddenly feeling a sharp pain in some part of the leg, most commonly at that part where the fibres become tendinous, accompanied by lameness. When the limb is examined, an inequality will be perceived at the pained part, a distinct concavity being formed by the separation of the lacerated extremities of the muscular fibres. This part is very tender to the touch, and though

in a short time after the accident, the whole calf of the leg becomes more or less swelled and tense; yet the particular part where the muscle has been injured, can always be distinctly pointed out by the patient.

The consequences of this kind of injury are extremely troublesome; a very considerable swelling with tension of a part of the limb come on, and the patient remains quite lame. These symptoms continue with little abatement until means are adopted to keep the lacerated parts at rest, so that the accompanying inflammation may subside, and a reunion of the lacerated fibres take place; for whenever the patient begins to move about, the tender parts are stretched; acute pain is brought on, and he thus becomes more lame. In this manner I have known patients suffer from the injury for several months.

The cure of this kind of injury is sometimes extremely tedious, particularly if, from early inattention, the necessary treatment has been neglected. The lacerated extremities of the fibres should be placed as soon as possible in contact, and carefully retained in that situation until they adhere. This is to be accomplished by relaxing the whole muscle, and preventing its extension to such a degree as would separate the ends of the torn fibres, until adhesion has taken place. The foot should be moderately

extended, and the knee slightly bent. A strip of linen should then be placed on the upper part of the foot, carried over the toes along the sole of the foot, heel, calf of the leg, and over the bend of the knee, and part of the posterior part of the thigh. This is to be secured in that situation by means of a circular roller, extending from the foot over the whole limb. The bandage is to be worn until the lacerated fibres are completely reunited; and this will be known from the patient acquiring a feeling of strength, and being able to throw the muscle into action without pain or uneasiness. In some cases adhesion has taken place in a few days, when the proper treatment was employed speedily after the injury. In other instances it has required several months before the limb could be used.

The symptoms and treatment of this injury may be farther illustrated by narrating the following cases.

CASE I.

A gentleman, when going across a street, stopped quickly to avoid a carriage. At this moment he had a sensation in the calf of his left leg, as if it had been struck with a stone, or by some very hard body swinging in his pocket; and so strongly was he impressed with this feeling, that he was surprised when putting his hand into his pocket, to find

it empty. This happened late at night, and I saw him early on the following morning. The posterior part of the limb had by this time swollen considerably. At the spot where he first felt the pain, there was a great degree of tenderness to the touch, and it was unequal and knotty to the feel, with a distinct depression at one part. Any motion of the limb gave pain, and he was unable to rest the weight of the body upon it.

The limb was bandaged in the manner which has been described, and from being lame and unable to move without great uneasiness, he could put his toes on the ground, and exercise that limited motion which the bandage admitted of, without pain. The swelling and tenderness of the limb abated daily, and in less than a fortnight he was able to use it freely without the bandage.

CASE II.

A muscular man, 40 years of age, when quickly running across a street, felt, to use his own expression, as if he "was shot on the leg." He became quite lame, and complained of acute pain at that part of the calf of the right leg where the muscular and tendinous fibres of the external gastrocnemius muscle unite. A good deal of swelling succeeded, and I saw him eight days after the acci-

dent. He was then very lame, complaining of pain in the calf of the leg where a distinct inequality or depression could be perceived, and there was a good deal of discoloration of the whole inferior part of the limb.

A bandage was applied in the usual manner; the pain and swelling subsided; and in ten days he was walking about with only a very slight lameness.

OBSERVATIONS

ON A

CHANGE OF COLOUR IN THE SKIN,

PRODUCED BY

THE INTERNAL USE

OF THE

NITRATE OF SILVER.

By I. A. ALBERS, M.D.

OF BREMEN.

Read Nov. 14, 1815.

THE skin of a woman, the history of whose distemper I shall communicate in the sequel, had contracted a blue colour all over the body. As there was not the least appearance of any disease in the heart, and as neither the circulation nor respiration were in the least affected, I was unable to trace the cause of this phænomenon; and I probably might have laboured in vain to discover it, had not my attention been drawn to it by a letter from the late Dr. Reimarus of Hamburgh, who informed me, that in his town two patients had exhibited a blue tinged skin, after the use of the nitrate of silver. Soon after I learned the same fact from Professor Rudolphi of Berlin, who

was at that time still residing at Greifswalde, where a physician of the place had made the same discovery. I shall now state the history of the case, which I have myself treated, and in which there can be no doubt, but that the change of the complexion was to be attributed to the use of the above-mentioned remedy.

A fat woman, aged 30 years, of a relaxed habit of body, but otherwise healthy, and the mother of four blooming children, in 1801 was seized, during the night, with epileptic fits, without there existing any cause, that could be assigned for them: these fits returned four times in the interval of from four till six o'clock. I prescribed the nitrate of silver, in the form of pills, and in the following dose.

℞ Argenti nitrici gran. iv.
Micæ panis albi q. s. f. pilulæ ponderis granorum duorum no: 84. Obduc. fol. argenti.
Dosis mane et vespere quatuor.

Although after the use of these pills the spasms did not return, the patient continued them without my knowledge, near three years and a half without intermission; in the latter part of this period, however, she took them only in the evening. Towards the end of the last year, she being then

pregnant of her fourth child, the change of her complexion became first observable, and particularly so in her face. The tinge was at first bluish; it then grew gradually darker, till at last it became, as it has since continued, quite dark and almost black. This blue colour has spread all over the body, yet is most intense on the face, on the forepart of the neck as far as the middle of her bosom, and on the hands and nails. Whenever the patient holds her arms in an erect posture, the blue colour is considerably lessened, and even disappears almost entirely. The sclerotica is likewise considerably coloured. The patient has on the arm a large scar, the result of a former issue, which appears quite white; at least I can discover no bluish hue in it. The blue colour is not of the same depth at all times, but often changes several times in one and the same day, without there being any determinate reason for it. At one particular time however, it appears strongest, namely, at the epoch of menstruation, after the accomplishment of which it again vanishes.

The patient's blood looks altogether like that of a person in perfect health. The woman is besides quite well, and does not experience the least impediment in breathing, and since the use of the nitrate of silver has only once had a relapse of her epileptic fits. A variety of remedies, for example, sulphuric acid, nitric acid, chalybeates, baths of

different kinds, &c. have hitherto been exhibited to no purpose whatever. The colour has for these ten years remained the same.

The three following cases were communicated to me by Dr. Schleiden of Hamburgh; the two former of which, however, were observed by Dr. Chaufepié, who is resident there, and only the latter one by himself.

A lady, 35 years old, employed this remedy eight years ago, and her sister, 38 years old, ten years back, against epileptic fits; no cure, however, was effected by it; but merely a less frequent return of the paroxysms. In both the blue colour is visible at this very time, and more particularly in those parts which are exposed to the light, as the face, hands, neck, and articulations; the colour is less strong on the body. The latter patient is coloured deeper than the former.

The third patient was a young man of 20 years, the son of a merchant of this town, born of an epileptic mother, and from his infancy afflicted with the same disorder. In this case there exists besides, from his early youth, an unconquerable propensity to onanism. All the remedies administered proved unsuccessful, and very frequently he was affected with three and four fits in one day. When I treated him five years ago, I exhibited the

nitrate of silver, the only remedy that had not yet been used. He made use of it during a quarter of a year with the only effect, that at the end of this period the paroxysms returned only once in a fortnight. But as the efficient cause of the disorder still continued to operate, under which circumstances no cure could be expected, I thought it incumbent on me, to rest contented with seeing the frequency of the fits lessened, fearing lest the continued use, in large doses, of this corrosive remedy might injure the stomach of so weak an individual.

Although I do not recollect to have read any observation made by an English physician on this effect of the nitrate of silver, yet a hint given by Professor Autenrieth, at Tubingen, induces me to think that they are known in England. This respectable gentleman told me when I was at Tubingen last year, that he was almost sure to have met with some such observation in an English work, but he could not find it afterwards. Professor Reuss of Gottingen, who is so eminent for literary erudition, likewise hunted for it, but without any better success. Professor Autenrieth's assertion struck me the more, as many physicians of Geneva, with whom I conversed on the subject, and who are so deeply read in English literature, did not know of any observation of this kind made by English physicians. If, however, I have

been anticipated, I hope the learned members of the Society will pardon me for communicating to them these remarks, and those of my two friends Dr. Chaufepié and Dr. Schleiden. I am anxious to collect information from all quarters on this subject, and shall be most thankful to any of the members of this highly respectable Society, for any information they may please to communicate to me; for which purpose I take the liberty of subjoining the following questions.

1st. As the blood in these patients is of the natural hue, can it be doubted, but that the blue colour must be looked for in the reticula Malpighiana, in which it is produced by the nitrate of silver?

2nd. Why does this effect of the remedy occur so seldom? and why does it often not take place at all, when exhibited in very copious doses, but not long continued, as is proved by an essay lately published by Dr. Powell *?

3rd. Is there any probability that this change of the cutaneous colour is produced by the protracted application of the remedy? If this were

* Observations on the internal use of nitrate of silver, in certain convulsive affections. By Richard Powell, M.D. Medical Transactions, published by the College of Physicians in London. Vol. IV. p. 85.

the case, the second question would be answered.

4th. Why do the parts exposed to the light, more particularly contract a blue colour?

5th. What remedies might be prescribed to cure this alteration of the skin?

Additional Facts relative to the subject of the preceding Paper. *By* P. M. ROGET, M.D. F.R.S. *Physician to the Northern Dispensary.*

HAVING some years ago met with an instance in which a change has taken place in the colour of the skin, similar to that described by Dr. Albers in the preceding paper, and arising from the same cause, I am induced, with the approbation of the Council, to subjoin to it a brief account of the history of this case, as well as of some others which have occurred on the continent: for it is only by accumulating evidence on the subject, that we can hope to arrive at the true theory of this singular phænomenon.

A young lady, about 25 years of age, while apparently in good health, was seized with an epileptic fit, which lasted twenty minutes. The misletoe, aided by occasional cathartics, was taken for a long time without any apparent advantage, and a second attack occurred about three months after the first.

It was more violent, and continued above an hour. I then directed her to begin a course of the argentum nitratum, in the form of pill: gradually increasing the dose from one to two grains, three times a day. At an interval of two months a third fit occurred. The dose of the remedy was still further increased, but another attack was experienced at the distance of three weeks from the preceding: it was, however, much milder than the last. The fits now continued to recur at irregular intervals of two or three weeks; but were on the whole becoming less violent, and at length ceased altogether, between nine and ten months from the period of the first attack. The dose of the nitrate of silver had by this time been increased by little and little, till the quantity taken amounted to 18 grains in the four and twenty hours. It was continued in this quantity with occasional intermissions of ten days or a fortnight, for four or five months, and then left off by gradual diminution of the doses. During the whole of the period that the patient was taking this medicine, her general health continued to improve, and she got rid of a variety of nervous feelings to which she had before been subject. Some time *after the remedy had been totally discontinued*, she observed that the tongue and fauces had acquired a very dark colour, as if stained with ink: this for a time increased, and afterwards somewhat diminished; but a considerable degree of blackness in those parts has remained permanently fixed. About a year and a half after she first began

to take the nitrate of silver, and several months after she had entirely left it off, it was observed that the complexion was growing dark: this was first noticed about the eyes, but not particularly about the lips. This change has gradually proceeded, without any perceptible derangement of health, affecting equally the skin over the whole body. It appears to have attained its maximum in the course of a year, and though it is now six years since she has taken any preparation of silver, still continues with nearly equal intensity. It is liable to occasional variations, which I have not, however, been able to trace to any determinate cause: the period of menstruation in particular, has no apparent connection with these changes. Of late years her health has been considerably deranged, apparently from the predominance of a nervous temperament; but there has not been the slightest threatening of her original complaint.

The effect in question has been noticed by Fourcroy *, as appears by the following passage: "Un ministre protestant des environs de Hambourg, attaqué d'une obstruction au foie, prit, par le conseil d'un empirique, de la dissolution nitrique d'argent. Ayant continué pendant plusieurs mois l'usage de ce remède, sa peau s'altéra insensiblement, et elle devint enfin presqu' entièrement noire. Il y avait plusieurs années que cette couleur durait, elle commencait pourtant a diminuer." It does

* Medicine éclaireé par les sciences physiques. Tom. I. p. 342.

not, however, appear that this observation had attracted much attention, since no analogous instance had been recorded till very lately. Dr. Butini, junior, in an inaugural dissertation, published at Geneva last year, "*De usu interno præparationum argenti*," after stating the above-mentioned remark of Fourcroy, gives the history of three cases, two of which were observed by his father, and one by himself, of the same dark hue in the skin following the long continued use of the nitrate of silver for the cure of epilepsy. In the first of these, the disease had supervened on an attack of hemiplegia, and threatened by the violence and frequency of its attacks to terminate by sudden death, or to destroy at least the mental faculties. All the ordinary remedies having failed, the nitrate of silver was tried, and its use continued for two years and a half, in which period 33½ drachms were taken, making an average of 2⅓ grains per day. The paroxysms were by this treatment rendered so mild, as hardly to partake of the epileptic character; and their tendency to recurrence was detected only by slight attacks of nervous anxiety and perturbation of mind. In the mean time, however, the face acquired a singular purple hue; this change being ascribed to the remedy used, it was discontinued, and the subsequent cure entrusted to the efforts of nature. Five years have since elapsed, during which time there has been no recurrence of epilepsy, and the mind has continued sound; but the dark colour of the skin has daily

become more intense. The head, and especially the face, is tinged with a deep violet approaching to black, and having a complete similitude to the negro, or to a bronze bust. The hands are as deeply coloured as the face. The sclerotica is but little changed: the rest of the body, which is covered by the clothes, has preserved its natural hue, with the exception of a very slight tinge scarcely perceptible unless in the shade, but still sufficiently manifest to shew that the whole skin has partaken of the affection produced by the silver.—In the second case, 7½ drachms of the nitrate were taken in the space of 15 months, which corresponds to a daily dose of one grain. The change in the colour of the face did not take place till after the disease had been completely cured. At the end of three years, no relapse had occurred, but the darkness of the complexion continued, though in a somewhat less degree.

Another case is detailed by Dr. Butini, as having occurred in the practice of Professor Delarive of Geneva. The epilepsy had affected the patient from the age of 12, and had continued with great obstinacy for four years. The nitrate of silver was at length resorted to; beginning with half a grain daily, and increasing this quantity every fortnight by half a grain. By pursuing this plan of treatment, the intervals between the paroxysms were much protracted; but the use of the remedy being interrupted in consequence of the patient's

travelling, they again became frequent, and it was resumed in the quantity of three grains daily, which was soon increased to six. The disease now, for the first time, appeared effectually to give way; and at the end of eight months, during which the remedy has been regularly continued, no distinct paroxysm had occurred, though there were several slight and transient affections which appeared to be connected with the disease. In this case also a slight blueish tinge is beginning to be perceptible.

I may, perhaps, be allowed to subjoin another case of epilepsy which has lately occurred to myself, in which I had prescribed the remedy in question, with the most marked beneficial effect on the disease: its attacks now occurring only at very distant intervals. I understand the same change in the colour of the skin, as in the other cases, is beginning to take place; but as my patient is on the continent, I am unable to state the fact otherwise than from the report of those who have lately seen him.

P. M. ROGET.

June 20, 1816.

G. WOODFALL, Printer,
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EXPLANATION OF THE PLATES.

Plate I. Is a delineation of the tumor in the face and neck, which was removed by Mr. Goodlad, as described p. 119.

Plate II. *fig.* 1. Exhibits Thomas Ellard, 18th Hussars,

A. The left shoulder very much thickened and enlarged.

B. Shews where the ball entered.

C. Shews where it made its exit.

D. At this place an abscess had formed, which was opened, and from which two or three small fragments of bone were extracted.

The figure also shews the semilunar incision, which commences at the anterior shot hole B, and was carried to the opposite side C,—making a flap.

Fig. 2. The appearance of the arm, after the wound was healed.

Plate III. Exhibits the dissection of the Monstrous Fœtus described by Mr. Maunoir, p. 257.

Fig. 1. Gives a front view of the principal viscera.

Fig. 2. The different parts of the alimentary canal more fully displayed.

a. The stomach.

b.b. The small intestines.

c. An intestinal tube branching off from the ileum in order to form the opening of

d. The cloaca; in which the rudiments of a tongue and jaw are seen at *f.f.*

g. Bifurcation of the ileum, giving rise to two cæca at *h.h.*

i. Right colon which is continued into a rectum in *k.*

k. Rectum terminating at the top of the uterus *l:* as it ends in a *cul-de-sac*, the meconium, having no exit, had accumulated and given to it a considerable volume. The uterus on this side is at least as large again as that of the other side at *p.*

The left cæcum is continued into the colon *m*, and the rectum *n*, which passing behind the uterus *p* (fig. 1.) terminates by an anus on the posterior side.

o.o. The kidneys.

s. Is an external ear, having no meatus.

t. The remains of a membrane which had been cut away.

v. Aperture communicating with the cloaca.

x. Portion of hairy scalp belonging to the inferior head.

N.B. The above references apply both to *fig*. 1. and 2.

Fig. 3. Shews the medulla spinalis proceeding from one spine to the other, and the mode in which the nerves were distributed from it to the two lower halves of the trunk, and to the inferior extremities belonging to each. See p. 263.

a. The termination of the spine belonging to the perfect head.

b. The termination of the spine proceeding from the imperfect head.

c,c. The medulla spinalis crossing from the one to the other.

d,d,d,d. Nerves supplying the pelves and lower extremities.

e,f. The two pelves.

Fig. 4, 5. The two kidneys, the left having two ureters, the right only one.

Plate IV. Represents the bistoury employed by Mr. Brodie in operating on varicose veins, as described in p. 198.

ERRATA.

Page 5,	*line* 7,	*for* diminish,	*read* diminishes.
6,	—— 2,	— root,	—— foot.
7,	—— 8,	— 9,	—— 7.
8,	in the note,	*for* genuine	—— generic.
22,	*line* 15,	*for* 41,	—— 41,6.
24,	—— 4,	— alumine,	—— magnesia.
26,	—— 6,	— supernatural,	—— supernatant.
36,	—— 3,	— evaporation,	—— composition.
46,	—— 22,	— Briant,	—— Briart.
47,	—— 24,	— Briant,	—— Briart.
65,	—— 5,		*dele* who.
68,	—— 5,	— these,	*read* them.

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J. A. ALBERS, M.D. Bremen. *Foreign Honorary Member.*

OBSERVATIONS AND CASES

RELATING TO THE

OPERATION

FOR

ARTIFICIAL PUPIL;

IN A LETTER FROM

MR. MAUNOIR OF GENEVA,

TO

PROFESSOR SCARPA OF PAVIA,

WITH THE

PROFESSOR'S ANSWER.

COMMUNICATED BY

DR. MARCET.

Read May 28, 1816.

Letter from MR. MAUNOIR, *to* PROFESSOR SCARPA.

SIR,

I HAVE delayed to convey to you the assurance of my gratitude for that confidence in my skill with which you have inspired the Marquis of Beaumanoir, until I should have some interesting information to give you relative to his case, and more especially until I should have in some degree justified your favourable opinion of me. I have been

indebted to you for one of the greatest enjoyments which can be experienced; that of creating, as it were, the faculty of sight, in a person whom time had not yet accustomed to the privation of a sense so precious, and who at the same time had lost nearly every hope of ever recovering it. I am indebted to you also for other, and still greater obligations. The charm of your letters, the friendship and esteem with which you honour me, and the excellence of your instructions have been to me the most powerful stimulants. You make me love my profession with greater ardour, and excite in my mind the liveliest desire of extending its limits. I transcribe for you in the words of the Marquis himself, the following account of the origin of his misfortune; the most trifling circumstances relative to this case cannot but be highly interesting.

" In the severe winter of 1784, I was first attacked by an inflammation in both my eyes, which prevented me from performing my military duty: for five weeks I had recourse to the following remedies: blisters on the nape of the neck, foot baths, whites of eggs applied to the eyes, &c. In November, 1796, my sight was affected by a second inflammation. I had been wounded about this time, and was copiously blooded to remove a difficulty of speech caused by the effects of the wound, which was received in the stomach, grazing the left ribs. Finding myself in the course of the winter affected with an incessant stammering, the bleedings were

repeated, during all which time there was a constant inflammation of the eyes. In the month of May they were restored to their natural state, and I recovered the entire use of my speech; but could neither give myself up to my professional service, nor to any thing which demanded fixed and serious attention.

" During a journey in Russia towards the end of the same year, I suffered from several slighter attacks of inflammation, which subsided without the application of any remedies. Having been obliged to pass the winter of 1798 in Siberia, the brightness of the snow, the rigour of the climate, the violence of the whirlwinds, to which I was frequently exposed, the ardent reflection of the sun upon the snow and ice, the penetrating smoke which fills the greatest part of the habitations of this dreary country, all these causes contributed to keep my eyes, which were already weak and delicate, in a continual state of inflammation.

" In 1800, I could neither write nor read. A little while after, I was still able to perceive the light, but less with the left eye than with the right. In the month of August of the same year, during my residence at Vienna, I consulted several eminent oculists, and among others Mr. Beer, who was of opinion that my sight could be restored only by an operation on the left eye, which he performed himself, but without success. Since that period I have

entirely lost the use of that eye; and the inflammation which resulted from the operation, did not subside, notwithstanding the application of every remedy, before the month of May in the following year.

"In 1806, I suffered again from another inflammation which lasted three weeks, after which time I entirely lost the power of conducting myself.

"In 1810, having become totally blind, I placed myself under the direction of Dr. Frederick at Vienna, and in the month of September of the same year, recovered the use of the right eye sufficiently to conduct myself alone. This advantage was but of short duration; intervals of more or less repose, and of severe inflammation, succeeded each other, until the year 1812, when I again totally lost my sight, preserving only the power of distinguishing, with my right eye, light from darkness.

"In 1813, I resigned myself entirely to the will of Providence, my medical advisers having declared that they could do nothing more for me. However being at Pavia in the year 1814, I consulted the famous Scarpa, who recommended me to place myself under the direction of Professor Maunoir of Geneva."

The state of his eyes when I saw them for the

first time at the beginning of April, 1815, was as follows.

They were large, prominent, the upper eyelid rather red than white, and slightly swelled; the conjunctiva covered with vessels a little too full; the iris of a bluish grey colour, and presenting, instead of the pupil in the centre, a white spot of the size of a small pin's head. This spot which could only be the corresponding portion of the capsule of the crystalline, seemed to be adherent to the iris in both the eyes, and was of a whitish grey colour in the left eye, and milk-white in the right. It was impossible to decide *a priori* whether the crystalline was transparent or opake, since it was entirely hidden by the iris, and by a small portion of the capsule. The Marquis preserved the faculty of distinguishing very clearly the transition from darkness to light; but this power was much weaker in the left eye than in the right.

Saturday, 12th of August, 1815, I operated on the right eye in the following manner.

The patient being seated on a chair and having the head inclined upon a cushion, I placed myself behind him, and with the forefinger of the left hand confining the upper eyelid, whilst an assistant depressed the lower; I made with the right hand a semicircular incision in the lower and external part

of the cornea. This incision occupied a full third of the circumference of the membrane. A quick movement of the eye during the operation, obliged me to bring the edge of the instrument so low as to cut slightly the conjunctiva, which occasioned a slight hæmorrhage; but the application of a sponge dipped in cold water, and a moment's repose remedied this little accident. On reopening the eye, the iris was seen projecting a little from the wound in the cornea. I replaced it with the blunt point of my scissors. Introducing the two blades closed into the anterior chamber, and then opening them, I caused the pointed blade to penetrate the iris, leaving the blunt blade between that membrane and the cornea; then closing the scissors, a perpendicular incision of the iris resulted, describing a little more than half the chord of an arc of two-fifths of the circumference of the iris, traced on the side of the temple. This first incision not having occasioned the formation of a pupil of the necessary size; I introduced the scissors into the iris a second time a little obliquely; and immediately the pupil appeared of a satisfactory form and size, but exhibiting the crystalline entirely opake.

The second stroke of the scissors had divided the capsula: I therefore introduced a small curette, in order to endeavour to destroy what adhered of the crystalline to the shrunk and contracted circumference of the old pupil. It will be seen

presently that this attempt did not succeed. Lastly I effected the passage of a portion of the opake lens by means of a slight pressure with a large scoop exercised on the lower part of the globe of the eye. The crystalline, which was of a cheesy consistence, came out with the greatest ease, and though it was not entirely removed, yet a sufficient quantity was discharged to leave the artificial pupil of a most perfect black. This new pupil was on the side of the temple; and at the exterior and lower part of the iris. The old pupil which had neither changed in form or size, and remained always closed by a white opake body, was not comprised within the area of the new pupil, but was situated internally, and above it. The new pupil had the form of an irregular trapezium. The Marquis received immediately some confused idea of objects in the light.

The eye was reopened the fifth day after the operation. The wound in the cornea was well healed, and the conjunctiva scarcely red. The patient had suffered no pain, but when the eye was exposed to the light, he saw nothing; the new pupil which had preserved its form and size was obstructed by that portion of the crystalline which I had not been able to extract, and which was extremely swelled. I hoped however that this fragment of the crystalline would sooner or later be absorbed either entirely, or in part, and that the new pupil would in the end become black; but I

was much afraid of the formation of a gutta serena. During the first three weeks after the operation, the Marquis of Beaumanoir distinguished no one object, and his despair as well as my anxiety continued daily increasing.

Notwithstanding, I saw the lower edge of the crystalline gradually disappear, and the pupil in the corresponding part become black, and yet in spite of this favourable change, the sight did not return. All at once, early in the month of September, he distinguished first his hand, then his fingers, then the houses in the street. Since this fortunate moment his sight has gradually acquired strength in proportion as the crystalline was absorbed.

At present, December 1, he can read written characters of the size of a fourth of an inch; he distinguishes the hour by the clock; he perceives at the same time the two hands of his watch; he conducts himself with ease in the street or in the road; he avoids obstacles, distinguishing men, women, children, and animals; he does not confound a willow with a poplar, or a poplar with an oak. He evidently gains something every day, and makes a sufficiently apparent progress.

The Marquis wished earnestly that I should operate on the left eye. I did it with repugnance, and not till I had warned him that I expected from

it little or no advantage. September 11, I made an incision in the cornea of this eye, in the same manner as I had before done in that of the right; and at the very instant the iris came out of the wound swelled and enlarged by the crystalline which was spontaneously displaced, so that the lens was in fact without the eye, forming a hernia of which the iris was the bag, veiling it closely, and enveloping it on every side. I gave a stroke of the scissors to the tumor, and the crystalline came out with the greatest ease, to all appearance whole, but extremely small. The iris did not re-enter spontaneously, but it was easy to restore it to its place. The pupil then appearing very small, I gave it a second stroke with the scissors, when the pupil which was of an irregular form, appeared of sufficient size and of a perfect black.

When I examined the eye on the fifth day after the operation, I found the pupil partly obstructed by the opake capsula, and partly contracted, but still sufficiently visible in the exterior and lower part of the iris, with a small round opening of a perfect black; it appears more than probable that if the retina had not been previously enfeebled by a violent disorder resulting from the first operation, the Marquis would have recovered the sight of his eye to a certain degree, without any difficulty. But the new pupil has remained during nearly a month, like that of an eye diseased with an amaurosis. It

is within a very few days only that this eye can be said to have gained something, and the Marquis can now distinguish the moon, a lighted candle, the fire, or any bright objects which pass before him. The only forms which he has yet been able to ascertain with precision, are the square frames of his windows.

I will not attempt to give you any idea of the form of the crystalline, which remains in the right eye, because it undergoes some change every week, and because it is probable that these changes will last until its entire absorption. I might assist this operation, in making a fresh incision with a needle upon the remainder of the crystalline, but I am unwilling to cause the slightest irritation to the eye, as long as the unassisted force of nature appears to act in an advantageous manner. It will not be till the natural force appears to be languid, or rather entirely inefficacious, that I shall expose by means of an incision a new crystalline surface to the action of the aqueous humour. With respect to the iris of the left eye, there is no crystalline to dissolve, and in consequence I propose to give it shortly a sufficient extent.

I proceed to lay before you some account of two other operations for artificial pupil, of which one took place a few days before that performed on the Marquis, and the other in the course of the last month. I copy simply my notes taken at the time.

" Mr. Cherbuliez, bookseller, 46 or 48 years of age, has had since his infancy an albugo on the left eye, caused by the small-pox; it occupies a full third of the cornea on the side nearest the temple, and the rim of the pupil almost adheres to this disordered membrane, a very small portion of it is free, which makes the edge of a pupil of the size of a small grain of millet, with which Mr. Cherbuliez can only see indistinctly, with pain, and very near. The cornea of the right eye is irregularly and nearly always obscured by a species of mist which is the consequence of frequent ophthalmia. This same eye had been lately affected with amaurosis, from which it had very considerably recovered. It was but of little use to the patient. The crystalline of the left eye was evidently transparent, and it became necessary to take care of it. I operated on the third of August, 1815, in the following manner:

" The patient was seated in a chair, his head resting on the breast of an assistant who at the same time raised the upper eye-lid. I placed myself behind him, and with the forefinger of the left hand, depressed the lower eye-lid. I then made with the right hand a semicircular incision of about three lines in length, and as much upon the opake part of the cornea as upon the transparent.

" I then introduced into the wound my blunt scissors, and penetrating with one of the blades through

the small pupil which I have mentioned, I succeeded in making an incision without wounding the capsula or the crystalline, cutting the orbicular muscle in a transverse direction, and continuing nearly parallel between the fibres of the diverging or radiating muscle; this incision describes an entire radius of the disc of the iris. Its immediate result was a perfect triangular pupil of the most brilliant black.

"Every thing went on well during the first 50 hours, when Mr. Cherbuliez having made a violent effort in going to stool, caused a small hernia of the iris. This accident did not change the form or the size of the pupil. I have three times effected the depression of this rupture of the iris, by introducing a needle for the cataract. At present the staphyloma is little or nothing.

"Mr. Cherbuliez has resumed the ordinary course of his affairs, he writes and can read the finest written characters, nor is his eye fatigued even by a long series of occupation."

I come now to the account of the last operation which I have performed.

"A woman of the name of Saillard, 26 years of age, and mother of an infant of some months, received a thorn in her left eye, as she was cutting wood in a forest, about two years ago. She did

not suffer much at the time, but the consequences of the accident were fatal to the sight of the eye. Her state when I saw her for the first time was as follows:

"The pupil which was shrunk and irregularly fringed, and entirely incapable of any movement of contraction or dilatation, was partly covered by a spot or shell, milk-white and apparently in conjunction with the iris. Where the pupil was not covered by this body, it appeared to me at first sight black, and the woman was still able to distinguish objects confusedly with this eye. The right eye had had a cataract for nearly a year, and the pupil was immoveable and fringed, the iris appeared to have been diseased, and the watery humour had not a healthy transparence.

"Being much occupied by a press of business, and not wishing to occasion a loss of time to the patient; thinking besides that the crystalline of the left eye was transparent, and that I had nothing to do but to increase the pupil which was too small, I took with me only my scissors blunted at both points; but at the moment of the operation, and favoured by a bright day, I perceived that the crystalline was decidedly opake, though at the same time in such a manner, that I could easily have supposed it to be transparent the first time I observed it, and especially in a situation where the light was not favourable.

"It was now evident, however, that it was necessary to extract the crystalline, and that if I enlarged the pupil with my blunted scissors, it could only be by cutting the iris in the upper part of its disc, an operation which would render the extraction of the crystalline difficult, and even perhaps impossible, since it was probable that some extraneous substance would adhere to it. In consequence of these considerations, I made my decision instantly, and performed the operation in the following manner:

"I first made an incision in the lower part of the cornea; then introducing the point of my instrument into the lower part of the iris, the puncture gave me an opening of the size of a pin's head, sufficient to allow the passage of one of the blunted points of my scissors, with which I cut the narrow strip comprised between the hole caused by the knife and the natural pupil; I then obtained immediately a pupil of a good size, and which exhibited a crystalline humour of a whitish grey colour. Then observing that the compression which I exercised upon the eye appeared in no degree to move the crystalline, I passed behind it a very small scoop, and drew it out of the eye by this means, with the greatest facility. The pupil was then of a perfect black, but the white spot had changed its situation and now obstructed the lips of the wound in the cornea. After having endeavoured in vain to remove it with the scoop, I was

obliged to seize it with the forceps, by which means I drew it out, together with a transparent membrane which adhered to it, and seemed to detach itself from the iris: it proved on examination to be that of the crystalline. The white body was of the size of a lentil, and entirely of a cartilaginous nature. The patient saw immediately, and distinguished perfectly every object which I presented to the eye, but they all appeared coloured with a tinge of blue.

"Six days after the operation, I shewed the woman to my society of medicine, where she was seen by Messrs. Odier, Peschier, Aubert, Colladon, De Roches and Morin. The cicatrix of the cornea was in a healthy state, the pupil of a good size and of a perfect black, the sclerotica was scarcely red, and the patient saw very small objects tolerably well. She returned to her house at Chable the next morning, seven days after the operation."

I have the honour to be, &c. &c.

J. P. MAUNOIR.

Geneva, December, 1815.

Letter from PROFESSOR SCARPA *to* MR. MAUNOIR.

SIR,

I have received with the highest satisfaction the account with which you have favoured me of the success of your operation on the Marquis of Beaumanoir. It gives me great pleasure to have been in any degree instrumental to the service you have rendered him, and I request you to present to him my hearty congratulations.

Every lover of the science cannot but feel interested in the narration of the difficulty which attended this operation, as well as that performed on Mrs. Saillard, on account of the opake crystalline, which in both cases adhered to the lower circumference of the iris, and the edge of the closed pupil. This has given me occasion to make some reflections on the subject, which I take the liberty of communicating to you with my usual freedom.

The detail of both the operations in the abovementioned cases, exposes a certain degree of difficulty and uncertainty in the proceeding, which I should wish to see removed or corrected; and I have great hopes that you will be able to attain this desirable object.

In the first place, I am of opinion that it is not necessary to be scrupulous whether the crystalline

be partly or entirely opake, whenever the capsule is opake, and adheres to the iris behind the edge of the interior and inclosed pupil. In this case, only one remedy can be pointed out, namely, the removal of the opake adherent capsule, and consequently of the crystalline, whether it be transparent or opake.—In the second place, I think there is no reason to doubt that, in similar cases, it is adviseable to make an incision upon the iris proportioned to the size of the body to be extracted, rather than to make it small, which obliges the operator to divide the crystalline and the capsule, with the intention of extracting a part, and of abandoning the rest to the powers of absorption.—Thirdly, I would establish as a fundamental principle in similar cases, that after the complete extraction of the crystalline with its opake capsule, by means of the least possible introduction of instruments, the artificial pupil ought not to be too near the incision in the cornea, and, consequently, not too near the cicatrix occasioned by it.

The causes of the obstacles, to which you were exposed in the two cases above mentioned, may, I think, be perceived from a consideration of the principles I have just stated. In both the incision in the iris was too small in proportion to the size of the body to be extracted; and in both, the position of the artificial pupil was very disadvantageous; that is to say, on the side of the temple and close to the incision in the cornea.

After reflecting attentively upon this situation of the artificial pupil, and upon the obstacles which it presents to the operator, it appears to me, if I am not greatly deceived, that a method of operation compounded of that of Wenzel, and of your own, would perfectly answer the desired end. Wenzel, as you are aware, made an incision upon the cornea and the iris with a single stroke of his instrument, taking care that this transverse incision should pass through or underneath the centre of the inclosed pupil. He then took off, by means of the scissors, a portion of the edge of the iris, for the double purpose of extracting with facility the opake crystalline with its capsule, and of leaving a permanent artificial pupil of sufficient size. In the method which I would suggest, after having made, in the manner of Wenzel, a transverse incision in the iris and in the cornea, I would introduce your scissors, blunted at both points, into the anterior chamber of the aqueous humour, with which I would make an incision in the iris, diverging from the cut made by the knife, so that your usual triangular edge might be the result, having a curvilinear side *. This aperture, which requires only a single stroke of the scissors, will be, I think, sufficiently large to allow easy egress to the crystalline and the capsule; and this so much the more easily, in proportion as the point of adherence of the capsule to the iris, is comprehended either entirely, or in a great mea-

* See Plate V. Fig. 1.

sure, within the two incisions. By this means the facility of making the crystalline and the capsule pass obliquely out from the iris will be increased on account of the enlarged space that will result from the cut with the scissors diverging from that made by the knife; and I should prefer this incision with the knife to the puncture made by you in the iris of Saillard, to afford a passage to the blade of the scissors. Besides this, the direction and the situation of the triangular edge of the iris will be calculated to leave a pupil not only permanent, and sufficiently large, but also placed opposite to the cut in the cornea, and accordingly more convenient for the purposes of vision; especially if it fall upon the side of the iris nearest the nose, which ought, if possible, always to be the case.

I have thus briefly given you my opinion on this subject. You will recollect that you permitted me to make objections and suggestions. I have done so; and it now belongs to you in the course of your practice to make trial of the method I propose, and either to confirm or reject it, or, which will not be difficult to you, to suggest some new and more practicable expedient. It is certain that this complicated case of the pupil, that is to say, where the crystalline is found opake, together with the capsule adhering to the iris, requires an exertion of genius and skill, united to a more perfect method of operation, than that which has been hi-

therto practised. Your researches have already been so numerous and so successful in this branch of our profession, that we have a right to expect you to proceed in the completion of your work. Till within a very few years, our knowledge respecting the artificial pupil, and the method of conducting the operation, was involved in great obscurity, and practice was sometimes even in opposition to the known anatomy of the eye. It is by solid and fixed principles alone that we ought to be guided in all that variety of complicated cases, which frequently accompany and aggravate the inclosed pupil. In estimating the extent of the services which you have already rendered to the profession, I run no risk of errour in enumerating the following facts as the results of your most useful researches.

1. That no instrument is so proper as the scissors for making an incision in the iris.

2. That to do this, when there is no complication resulting from a cataract, a very small incision in the cornea is sufficient, about half the size of that which is made for the extraction of the crystalline,—a fact which on many accounts is of the highest importance.

3. That the formation of a triangular edge in the iris by means of a double incision with the

scissors, is the most easy and least painful of all the methods hitherto proposed for obtaining a *permanent* artificial pupil.

4. That the spots of the cornea present no obstacle, because it is possible to produce the artificial pupil in that part of the cornea remaining transparent, in the quarter opposite to that in which the incision is made,—a fact of the greatest importance.

5. That it is possible to obtain the artificial pupil without injury to the crystalline or its capsule, whenever these parts are preserved transparent, in spite of complete confusion in the iris.

If to these advantages, which your method of operation possesses over all those hitherto practised, you are able to add that of rendering as little laborious as possible the manner of making the artificial pupil, in those cases where it is necessary to remove at the same time the crystalline and its opake capsule adherent to the lower surface of the iris, you will fulfil not only all my wishes, but those of all who are interested in the cause of humanity, and in the progress of science. The state of my health does not permit me to follow you in this useful career, and leaves me only the power of witnessing and of applauding your success. I have much pleasure in informing you that your scissors have begun to be used here, and Signor Morigi,

my successor in the chair of surgery, has lately availed himself of them with great success in an operation for the artificial pupil. He is a man of considerable ability, whom you will find mentioned with deserved praise in several places of my work.

I have the honour to be your most sincere friend and humble servant,

A. SCARPA.

Pavia, Jan. 1, 1816.

CASE

OF

INFLAMMATION

IN THE

MUSCULAR STRUCTURE

OF THE

HEART;

By EDWARD STANLEY, Esq.

ASSISTANT SURGEON TO SAINT BARTHOLOMEW'S HOSPITAL.

Read June 11, 1816.

AT the request of my friend Mr. Lawrence, I have been induced to present to the Society the history of the following case of inflammation in the muscular structure of the heart, which occurred in one of the boys at Christ's Hospital. The first part of the narrative belongs to Mr. Field, the apothecary to that institution, who obligingly allowed me the use of his notes for the present occasion.

" The subject of the case was twelve years of age, and although of a delicate frame, had enjoyed

generally a good state of health. On Saturday the 20th of April he was apparently quite well, having been on that day on a visit to one of his relations, by whom this remark was made. On the next morning he was brought to the infirmary, discovering at that time the usual symptoms of fever, namely great bodily heat, a quick pulse, the tongue white, and much furred. On the next day (Monday) his fever was much increased, but the only pain of which he complained was in the left thigh and knee, which ceased before night; in the afternoon he became delirious with much watchfulness. On Tuesday, the delirium was very considerable, but without any comatose tendency, the pupil of the eye much dilated, but not insensible to light. He complained but little of pain, but when closely pressed upon that subject, he pointed to his forehead. Early in the afternoon of that day, he had a kind of convulsive fit, which soon went off. In the evening all his symptoms became aggravated, and he passed the night almost without sleep. On the following morning he appeared much sunk, his breathing for the first time became difficult. He was then sufficiently sensible to answer any question put to him, but soon afterwards he became insensible, and gradually declined until about two in the afternoon, when he expired." It may be here observed that at no period of his illness did he complain of pain in any part of the thorax, nor was there any irregularity, either in the action of the heart, or pulsations of the arteries.

Mr. Field proceeds to state that " as the delirium which commenced on Monday afternoon was similar to what frequently occurs in the earlier stages of fever, particularly in young persons, there was no indication, until the following morning, which could lead to the supposition of organic disease. It then became probable from the symptoms, that there was effusion within the head. The medical treatment until that period had been directed to counteract general fever, namely evacuants and antimonials with the warm bath. Leeches were afterwards applied to the temples, a blister to the nape of the neck, and several stools procured by a calomel purgative combined with rhubarb.

It having been considered from the general character of the symptoms that the cause of death was to be sought in the head, this was the part first inspected; but after an attentive examination of the brain, nothing farther could be remarked than that the vessels were generally turgid, not more so, however, than is frequently seen when death has taken place, under circumstances that lead to no suspicion of affection of the head. One circumstance may be here mentioned, that although the boy was but twelve years of age, yet the thickness of the skull very far exceeded what is usual even in an adult. There was no appearance of diploë, the bone being uniformly solid and dense throughout, and hence the skull-cap was exceedingly

weighty. The sutures were likewise almost universally obliterated, there being scarcely the least vestige of them remaining in either table of the skull. From the head, I proceeded to the abdomen, where every thing was healthy; having laid open the thorax, the lungs were also seen to be healthy, but upon opening the pericardium, it was found to contain between four and five ounces of turbid serous fluid, with flakes of coagulable lymph floating in it. The internal surface of the membrane, both where it constituted the exterior bag, and the reflected layer upon the heart, was covered in various situations with a thin layer of lymph exhibiting a reticulated appearance. The size of the heart was natural in relation to the age of the individual. Upon cutting through its parietes, the fibres were exceedingly dark coloured, almost of a black appearance. This evidently depended on the nutrient vessels being loaded with venous blood. The fibres were also very soft and loose in their texture, being easily separable, and with facility compressed between the fingers. Upon looking closely to the cut surface exposed in the section of either ventricle, numerous small collections of dark coloured pus were visible in distinct situations among the muscular fasciculi. Some of these depositions were situated deeply, near to the cavity of the ventricle, while others were more superficial, and had elevated the reflected pericardium from the heart. The muscular fibres of the auricles were

also softened in their texture, and loaded with blood, but without any collections of pus between them. All the cavities of the heart were loaded with coagulated blood. The internal lining, valves, and every other part of the organ exhibited nothing worthy of remark, except the state of general turgescence in the capillary vessels, which had also extended to the lower part of the trachea, bronchia, &c. . . . .

After this report of the appearances met with on dissection, there cannot, I should apprehend, be any hesitation in viewing the case as an example of acute inflammation attacking the muscular structure of the heart, constituting genuine carditis. It must be admitted that this is a disease of exceedingly rare occurrence: for in the greater number of cases recorded under this denomination, it would rather appear that the inflammatory action had begun in the pericardium, it being commonly confined altogether to this membrane, and but occasionally extending a little way into the substance of the heart beneath. In those few instances where the heart itself has undergone such changes of structure as have been considered to result from inflammation, it is stated that the organ has sometimes become enlarged, and sometimes small and contracted, and that the muscular fibres have generally been of a pale yellow colour, and much softened in their texture, so as readily to allow the

finger to pass between them *. In the work of Corvisart, there will be found references to cases from Barrerus, Forestus and Fontanus, where distinct abscesses have been met with in different parts of the heart. One such instance lately came under my examination, where a considerable abscess had been formed in the parietes of the left ventricle near to the apex, there being opposite to the situation of the matter, ossification in the lining of the ventricle, with surrounding ulceration. I have not however been able to meet with any case on record, where, as an immediate effect of acute inflammation, suppuration has extended generally throughout the muscular structure of the organ.

The case related in this paper will, I think, be regarded as worthy of record, not merely on account of its rarity, but also on account of its peculiar symptoms. We have here presented to us an instance of inflammation attacking the heart, so violent as to pass immediately into suppuration, and at the same time so destructive as to prove fatal in four days from its commencement, and yet of the symptoms which arose, there was not one which

* In one of the cases of carditis mentioned by Bang in his Selecta Diarii Nosoc. Reg. Frideric. Hafniensis, it is stated that the heart was greatly enlarged, especially in its right side. In most of the cases referred to by Corvisart, it is mentioned that the heart was small and contracted. Frequently however no notice is taken of the size of the organ.

appeared directly referable to the affected organ; on the contrary, from their general tendency, the attention of the practitioners was diverted from the central organ of the circulation, the actual seat of disease, to the centre of the nervous system, where there existed no organic derangement. I feel happy here to remark how strongly this case confirms the truth of the observations made by a highly respected physician, who has noticed the reciprocal influence which the sanguiferous and nervous systems have on each other. Hence, as he observes, "we cannot be surprised that the diseases of distant parts should be confounded with each other, or even that the centre of the one system should sometimes be the supposed seat of a disease, which actually affects the centre of the other *."

* Pathological Researches, by J. R. Farre, M. D.

CASE OF A WOUND

OF THE

PERONEAL ARTERY,

SUCCESSFULLY TREATED BY LIGATURE.

BY GEORGE JAMES GUTHRIE, Esq.

Read May 14, 1816.

THE surgery of diseased and wounded arteries has within these few years been so much improved by the science and true professional boldness of several of our best surgeons, that little perhaps remains to be added to the principles on which operations have been instituted on the more important vessels of the human body. The external and internal iliac, the carotid, the femoral, and the axillary arteries have all been secured by the surgeon, and the ligature of the subclavian has been frequently, although hitherto unsuccessfully, attempted. The operations to be performed on these

large vessels have occupied the attention of every surgeon, and the necessity for their performance frequently occurring, both from circumstances of disease and accident, has rendered them objects of more universal interest to the junior branches of the profession, than those on the smaller vessels, which from their being less exposed to accident, less liable to bad consequences after injuries, and not so immediately the seat of operations from disease, have not made so strong an impression, and are not so much attended to as they perhaps deserve. I allude especially to the three arteries of the leg, and with this impression, I beg now to claim the indulgence of the Society for the relation of a case, in which the peroneal artery was successfully tied. I would not trespass on the time of the Society with a case that may be considered by many so unimportant, if I could find any other satisfactorily recorded, in which the operation of securing it by ligature in the thick part of the calf of the leg had been successfully accomplished. I am aware that this operation must very seldom indeed be necessary from disease, and the artery is well protected against all the common accidents of domestic life; but as every part is exposed in military warfare, I am inclined to believe this has not hitherto escaped, but that operations have been performed in consequence, which I consider improper, or that nature has been able by the exertion of her own powers to prevent hæmorrhage, as we know fre-

quently occurs on the division of the femoral or brachial arteries, and I believe even in one case of the external iliac.

The subject of my operation, Henry Vigarelie, a private in the German legion, was wounded on the 18th of June, at the battle of Waterloo, by a musket ball which entered the right leg immediately behind and below the inner head of the tibia, inclining downwards, and under or before a part of the soleus and gastrocnemius muscles, and coming out through them four inches and three quarters below the head of the fibula, nearly in the middle, but towards the side of the calf of the leg. In this course it is evident that the ball must have passed close to the posterior tibial and peroneal arteries; but as little inflammation followed, and no immediate hæmorrhage, he was considered to be one of the slighter cases. On the latter days of June, he occasionally lost a little blood from the wound, and on the 1st of July a considerable hæmorrhage took place, which was suppressed by the tourniquet and did not immediately recur on its removal. It bled, however, at intervals during the night; and on the morning of the 2d, it became necessary to re-apply the tourniquet, and to adopt some means for his permanent relief.

Having gone to Brussels after the battle of Waterloo, with the view of obtaining additional sup-

port to some opinions I had advanced in military surgery, this man was shewn to me by my friends, Messrs. Campbell and Hill, surgeons to the forces, under whose care he was, and who were desirous of avoiding an amputation, if possible, although the site of the wound, and the uncertainty of the vessel wounded, as it bled from both openings, rendered it doubtful.

The man had lost a large quantity of blood from the whole of the bleedings, his pulse was 110, the skin hot, tongue furred, with great anxiety of countenance: the limb, from the application of the tourniquet from time to time, was swelled, a quantity of coagulated blood had forced itself under the soleus in the course of the muscles, increasing the size of the leg, and florid blood issued from both openings on taking the compression off the femoral artery. On passing the finger into the outer opening, and pressing it against the fibula, a sort of small aneurismal tumour could be felt under it, and the hæmorrhage ceased, indicating that the peroneal artery was in all probability the only vessel wounded.

In this case there was, in addition to the wound of the artery, a quantity of blood between the muscles, which in gun-shot wounds accompanied by inflammation is always a dangerous occurrence, as it terminates in profuse suppuration of the con-

taining parts, and frequently in gangrene. The evacuation of it, therefore, became an important consideration, even if the hæmorrhage had ceased spontaneously.

The man being laid on his face with the calf of the leg uppermost, I made an incision near seven inches in length in the axis of the limb, taking the shot-hole nearly as a central point, and carried it by successive strokes through the gastrocnemius and soleus muscles towards the peroneal artery, which I attempted to discover, but this was more difficult than might be supposed, after such an opening had been made. The parts were not easily separated, from the inflammation that had taken place, and those in the immediate track of the ball were in the differing stages from sphacelus to a state of health, as the ball in its course had produced its effect upon them, or their powers of life were equal or unequal to the injury sustained.

The sloughing matter mixed with coagulated blood readily yielded to the back of the knife, but was not easily dissected out. The spot where the arterial blood came from was distinguishable through it, but the artery could not be perceived, the depth of the wound rendering any operation on it difficult. To obviate this inconvenience, I made a transverse incision outwards from the shot-hole to the edge of the fibula, which enabled me to

turn back two little flaps, and gave greater facility in the use of my instruments. I could now pass a tenaculum under the spot from whence the blood came, which I raised a little with it, but could not distinctly see the wounded artery in the altered state of parts so as to secure it separately. I therefore passed a small needle, bearing two threads, a sufficient distance above the tenaculum, to induce me to believe it was in sound parts, but including very little in the ligature, when the hæmorrhage ceased: another was passed in the same manner below, and the tenaculum withdrawn. The coagula under the soleus were removed, the cavity washed out by a stream of warm water injected through the external opening, the wound gently drawn together by two or three straps of adhesive plaster, and the limb enveloped in cloths constantly wetted with cold water. The patient was placed on milk diet.

On the 4th, two days after the operation, the wound was dressed and looked very well, the weather being very hot; two straps of plaster only being applied to prevent the parts separating. On the 5th, a poultice was laid over the dressings, in lieu of the cold water, the stiffness becoming disagreeable. On the 6th, as the wound, although open in all its extent, did not appear likely to separate more, the plasters were omitted, and a poultice alone applied. On the 8th and 9th, it

suppurated kindly; and on the 10th, or eight days from the operation, the ligatures came away, the limb being free from tension, and the patient in an amended state of health, his medical treatment having been steadily attended to.

From this period, the cure went on, although slowly, without accident; a small abscess formed at the inner and lower edge of the soleus muscle, but closed shortly after its contents were evacuated. The wound was entirely healed in three months, but the leg was bent on the thigh, and required mechanical means for its extension.

The length of the fibula is 16 inches. The cicatrix of the wound made by the ball is $4\frac{3}{4}$ inches below the head of the fibula. The sound limb, $4\frac{3}{4}$ inches from the head of the fibula, is $13\frac{3}{4}$ inches in circumference. The limb operated on $11\frac{3}{4}$ inches, being a diminution of two inches. The length of the cicatrix is $6\frac{1}{2}$ inches. The artery was tied therefore by computation $1\frac{1}{4}$ inches below where it is usually given off by the posterior tibial.

The man is now in the York Hospital at Chelsea, and walks about without appearing lame, although he cannot do so for any great distance. He suffers no pain, except an occasional kind of cramp in the ball of the foot, and some contraction

of the toes, which take place generally when he rises in a morning, and continues for a minute or two, until he puts them straight with his hand; this I do not attribute to the operation, but to some additional injury done to the nerves by the ball, in its course through the leg.

CASE

OF A

GUN-SHOT WOUND,

AND

FRACTURE OF THE TIBIA,

IN WHICH

A SETON

WAS SUCCESSFULLY EMPLOYED IN PROMOTING A CURE;

By JOHN BOGGIE, Esq.

SURGEON TO THE FORCES.

COMMUNICATED BY

MR. WARDROP.

Read May 14, 1816.

INSULATED cases often become extremely valuable in establishing general doctrines, or in illustrating practical rules in medicine; for by supplying one link in the chain, they enable a series of facts to be classed together, with which no connection had previously been established. On this account, the following case may not be considered unworthy of being read before the Society; for although the use of a seton in this instance could have afforded no probable grounds for suggesting

the practice as a general one in ununited fractures, yet it shews the utility of it under particular circumstances, and may illustrate some of the facts and observations which have been made on the subject by Mr. Wardrop, in the Fifth Volume of the Transactions of this Society.

An officer of the 95th regiment, at the battle of Orthes, received a musket-shot through the right leg. The ball entered on the anterior spine of the tibia, $2\frac{1}{2}$ inches from its articulation with the foot. It passed obliquely outwards through the substance of the tibia, injured the fibula, and came out towards the exterior edge of that bone. The healing process went on without any interruption for one month; during which time several small exfoliations took place. At this period, when walking in the room with crutches, he suddenly fell, and fractured both bones at the site of the wound. A most violent attack of inflammation immediately succeeded, accompanied with such a degree of general fever, as to produce delirium. Fomentations and poultices were applied to the wound, and large evacuations of blood, with a rigid antiphlogistic treatment, were employed. By these means the inflammatory symptoms were subdued, healthy suppuration came on, the cure again went on progressively, the bones had apparently united, the outer wound had entirely healed, and the inner had nearly cicatrized. At this time, being about two months from the time of the fracture, the limb be-

gan to swell, the discharge, from being of a good consistence, became thin and watery, and he felt at times slight rigors, a complete stop being thus put to the process of consolidation in the bone and to the healing of the soft parts. On introducing a probe into the anterior wound, it passed through a canal in the substance of the tibia, and the point could be felt at the cicatrix of the exterior wound. As it was conceived that the ossific process was not likely to be completed, and that the discharge of matter produced not only much local pain, but a great deal of general irritation, a seton was introduced, which entered the anterior wound, passed through the canal formed in the bone, and was brought out at the cicatrix of the exterior wound. A most favourable change took place almost immediately. Many small portions of bone were brought away by the seton, which was drawn through every day; the discharge soon lessened in quantity, and became again of good consistence; the swelling of the limb also subsided entirely. As the canal in the bone filled up, the seton was gradually lessened, till at last, about five weeks from the time of its introduction, it was altogether withdrawn. Both wounds healed up soon after. The limb remained somewhat shortened, but the union of the bone was at this time completed.

AN ACCOUNT

OF

A NEW METHOD OF OPERATING FOR THE CURE

OF

EXTERNAL ANEURISM,

WITH SOME

OBSERVATIONS AND EXPERIMENTS

ILLUSTRATIVE OF THE

EFFECTS OF THE DIFFERENT METHODS

OF PROCURING THE

OBLITERATION OF ARTERIES.

By PHILIP CRAMPTON, Esq. F.R.S.

SURGEON GENERAL TO THE ARMY AND FORCES IN IRELAND.

COMMUNICATED BY

MR. B. C. BRODIE.

Read April 2, 1816.

EARLY in the last century the attention of all those who took an interest in the progress of scientific surgery, was attracted by the experiments of Messrs. Petit, Pouteau, and Kirkland, on the arteries of brutes. If those distinguished surgeons failed in establishing the theoretical points towards which their researches were directed, they at least had the merit of instituting an experimental inquiry upon the most interesting part of surgical

practice, and of exhibiting an exquisite example of the means by which such enquiries can most successfully be pursued.

The interest excited by these researches had in a great measure declined, when Dr. Jones pursuing the same line of investigation, arrived at results which have again engaged the attention of the physiologist and the surgeon, and have already materially influenced the opinions and practice in that part of surgery which relates to the treatment of diseased and wounded arteries.

From a series of well contrived experiments upon brutes, Dr. Jones was led to draw the following practical conclusion, namely,

" That if the ligature does not completely cut through the internal and middle coats all round the artery, adhesion cannot take place between its internal surfaces, and therefore secondary hæmorrhage will take place as soon as the ligature has ulcerated through any part of the parietes of the artery *".

This conclusion which has been adopted by some of the most distinguished surgeons in these countries, and which, if just, must so materially affect the practice in the treatment of diseased and wounded arteries, rests however upon no other

* Jones, p. 170.

foundation than several experiments made on the arteries of quadrupeds in *all of which* the internal and middle coats were ruptured by the application of the ligature. No comparative experiments, however, are related in order to shew that this operation of the ligature is so essential to the process of union that under these circumstances only can the obliteration of the artery take place. But all general conclusions drawn from the analogy, which is supposed to subsist between the arteries of quadrupeds and man, must be received with the greatest caution, since a few considerations will be sufficient to shew that this analogy is more apparent than real.

1. It may be stated in general, that the adhesive process is more quickly and certainly executed in all the parts of quadrupeds (with the exception of the skin) than in man.

2. In quadrupeds wounds of the arteries in particular are so prone to unite, that no experimentalist has hitherto succeeded in producing an aneurism in this class of animals; the wounds of the arteries which have been inflicted with this view, healing like wounds made in any other part of the body *.

3. The arteries of quadrupeds are not liable to

* Experiments have failed to produce aneurism in dogs, horses, &c. Jones, p. 117.

that peculiar change of structure from disease which predisposes to aneurism, and which among other causes renders the operation of the ligature so uncertain in its effect upon the arteries of man.

Aneurism is accordingly a disease peculiar to the human species. It follows therefore that although in animals the obliteration of an artery should constantly succeed to the division of its internal and middle coats by the ligature, no conclusion should be drawn with respect to the effects of this operation upon the arteries of man. It is true that the experiments of Dr. Jones perfectly illustrate the process of nature by which the injury inflicted by the ligature is repaired, and it is true that this process is precisely similar, whether it occur in the artery of a quadruped or a man; but the *difference* is, that the process which is always successful in the former, not unfrequently fails in the latter; and it has been shewn that the causes of this failure are to be found in some difference in the structure or actions of the arteries in the different animals.

I shall now endeavour to shew from a variety of observations and experiments upon the arteries of man as well as animals,

1. That the obliteration of an artery can very certainly be effected, independently of the rupture or division of any of its coats.

2. That this operation of the ligature, so far from being essential to the process, not unfrequently defeats it.

Numerous instances are on record of arteries being obliterated by the pressure of tumours. The subclavian and carotid have been found obliterated by the pressure of an aneurism of the arch of the aorta *.

In Mr. Freer's experiments the pressure of a tourniquet for four days, was sufficient to effect the obliteration of the radial artery in horses †.

Mr. Hunter observed, that in dogs the mere exposure of the tibial artery to the air for about an hour, excited such a degree of inflammation and thickening of its coats, as completely to obstruct the canal ‡.

All the great arteries, the aorta inclusive, have been found obliterated in consequence of the effusion of lymph from their internal coat, and this independent of any injury which could produce the rupture of that membrane.

The cure of aneurism by compression (whether

* Hodgson, p. 110.—Medico-Chirurgical Transactions, Vol. I. p. 12.

† Observations on Aneurism, p. 14.

‡ Hunter on the Blood, &c.

mediate or immediate) affords an example of the obliteration of an artery, independent of any rupture of its internal coats.

The following experiments, selected from a great number which were performed upon the arteries of horses and sheep, will be sufficient to prove that in quadrupeds the obliteration of an artery can be as certainly effected without any perceptible injury being inflicted on its internal coat, as when that membrane is completely divided by the ligature.

EXPERIMENT I.

The carotid artery of a sheep was compressed by means of a flat tape one-eighth of an inch in breadth, passed through the holes of the "*presse artère.*" The ligature was drawn no tighter than was sufficient to bring the internal surfaces of the artery into contact. At the expiration of 26 hours the ligature was withdrawn; 25½ hours afterwards the animal was killed. The artery presented the following appearances. About an inch and a half above and below the ligature, the parietes of the artery were thickened by the effusion of coagulated lymph between its coats; the area of the portion between the ligature and the head was considerably diminished; the canal was so completely obstructed at the place of the ligature, as to be impervious to water; but upon plunging one extremity of the artery into a vessel of water, and blowing strongly

into the other, the free escape of air-bubbles ascertained that the obstruction was not of a nature to resist any considerable degree of force. On slitting open the artery, a band of coagulated lymph slightly tinged with blood was found, adhering to the internal coat, and occupying its whole circumference. The band was about one-eighth of an inch in breadth, at the part of the artery that was touched by the tape, and about half as much more at the part corresponding to the foot of the "*presse artère.*" The effused lymph was easily separated from the internal coat, the surface of which, though opake, was perfectly smooth and unbroken; a long and slender coagulum of blood was slightly attached to the lower surface of the effused lymph.

EXPERIMENT II.

A slip of thin white iron one-eighth of an inch in breadth and about one inch in length, was passed under the carotid artery of a sheep, its extremities were lapped over each other in such a way as to form a flat oval in which the artery was included, and gently compressed. Great care, however, was taken not to contract the area of the vessel so much as completely to interrupt the current of the blood; the parts, when examined at the expiration of 60 hours, presented the following appearances. The artery for the extent of three inches was bedded in coagulated lymph. When the slip of tin was removed, the vessel retained a

flattened form at the place at which it had been compressed; at this point the internal surfaces were in contact, but did not cohere; the area of the tube seemed to be obliterated by a thickening of the coats, or, to speak more correctly, by an effusion of coagulated lymph between the cellular and middle coat. The internal coat was somewhat corrugated and opake, but it had not thrown out any lymph, the diameter of the tube was sensibly diminished for nearly an inch above and below the part to which the compression had been applied, and the existence of a long coagulum in the lower portion of the artery ascertained that the obstruction had been complete.

That in man the division of the internal and middle coats not unfrequently prevents the obliteration of the artery, and gives rise to secondary hæmorrhage, may, I think, be collected from the following observations.

It seems to be well established, that ulceration or rupture of the internal and middle coats of an artery, whether it occur with or without a morbid dilatation of the tube itself, is the immediate cause of aneurism, and that the predisposing cause of this disease is to be found in certain morbid changes of structure, to which the arteries of man are peculiarly liable. But we effect by the ligature that very rupture of the internal and middle coats which is stated to be the immediate cause of aneurism;

and this violence is inflicted on an artery in a condition the most favourable for the production of the disease. Why then (it will be inquired) does not aneurism more frequently succeed to the rupture of the internal and middle coats by the ligature? The answer is obvious. Sometimes this consequence is prevented by the adhesion of the newly ruptured surfaces: sometimes it is prevented by the sloughing or ulcerative process, which, by laying open the arterial canal, gives rise to fatal hæmorrhage: and sometimes aneurism actually does take place. Although the two former of these terminations are of the most frequent occurrence, still the records of surgery furnish abundant examples of the rupture of the artery at the place of the ligature, and the consequent effusion of blood into the sheath, or into the surrounding cellular substance. This is the affection which was formerly described as "a swelling or dilatation of the artery above the ligature," and was supposed to be produced by the pressure of the blood obstructed in its course.

A case of rupture of the artery immediately above the ligature is described by Guattano, as having occurred to Acrell *. But in a case recorded by

* Cum vero inferiorem (scil: ligaturam) contraheret ex inopinato arteria supra superiorem disrupit, &c. Guattani de Aneurysm. It is unnecessary to multiply quotations in illustration of a fact, which is of but too frequent occurrence.

Mr. Warner *, the brachial artery gave way three times under the ligature, and at each time formed a distinct aneurism. It appears then,

1. That we are not warranted in concluding "that the internal and middle coats must be cut quite through all round the artery, in order to procure the adhesion of its sides †," but merely that adhesion may take place under such circumstances.

* "In a few days after the operation (amputation of the arm) the humeral artery became so dilated above the ligature, as to endanger its bursting. Upon this account it was judged necessary to perform the operation for aneurism, which was done, and the vessel was secured by ligature, above the upper extremity of its distended coats. After this operation, every thing went on seemingly well for some time, when suddenly the artery appeared again dilated, and was in danger of bursting above the second ligature. These circumstances made it necessary to repeat the operation for aneurism, and from this time every thing went on successfully, till the stump was on the point of healing, when quite unexpectedly the artery appeared a third time, diseased in the same manner as before, for which reason a third operation was performed. The last operation was near to the axilla. The patient continued well from this time, without any relapse." Warner's Cases in Surgery.

Mr. Hodgson, in his valuable book on the diseases of the arteries, observes, "that the experiments of Dr. Jones, prove that the sudden laceration of the internal and middle coats of a healthy artery is not followed by the formation of aneurism." But it is to be observed, that Dr. Jones's experiments were confined to the healthy arteries of quadrupeds, in which it has been shewn that aneurism cannot be produced by any means hitherto employed. His experiments therefore cannot be considered as bearing upon the question.

† Jones, p. 170.

2. That *in man*, the rupture of the internal and middle coats by the ligature not unfrequently gives rise to aneurism*, and to secondary hæmorrhage.

3. That a very moderate degree of irritation applied to the *external* coat of an artery, aided by a sufficient degree of compression to bring its internal surfaces into contact, is sufficient to effect the obliteration of the canal.

4. That the permanent obstruction of the canal may be effected by such a process in a period not exceeding twenty-four hours. I shall now proceed to make application of these principles to the treatment of diseased and wounded arteries.

It is somewhat surprising that correct notions with respect to the nature and treatment of aneurism should have been entertained long before the discovery of the circulation of the blood, for

* I have said *aneurism*, because, in point of fact, every case of secondary hæmorrhage would become a case of secondary aneurism, but that the external wound leading down to the artery, gives issue to the blood as fast as it escapes from the ulcerated or ruptured vessel.

The operation for popliteal aneurism is on the other hand so full of uncertainty and danger, that hardly any cases can be mentioned in which surgeons have not been alarmed, and the patient in great danger from secondary hæmorrhages. It is an operation never performed but by surgeons of the first eminence, and yet more perhaps have died than have survived it. Hunter himself has lost his patients, and those whom he did save were endangered by secondary hæmorrhage.—J. Bell, p. 225.

although distinctions were made, founded on a real or supposed difference in the origin or seat of the disease, still it was generally admitted that aneurism was produced by the pressure of the blood, acting upon a weakened or ruptured artery, and that a cure was to be attempted by obstructing the blood in its course to the tumor. Some errours in the practical details in general rendered these attempts abortive, and it was reserved for Mr. Hunter to suggest an operation which should accord with views at once so simple and so just. But if Mr. J. Bell's spirited description of the danger attendant upon the Hunterian operation be somewhat overcharged, still all practical surgeons will admit that they look with anxiety for some means of averting dangers, the reality of which they have but too often had reason to lament. Accordingly we find Mr. Hunter himself, Sir Everard Home, Sir W. Blizard, and several other distinguished surgeons, both in these countries and on the continent, endeavouring by various contrivances to compress the artery from without with a view of taking off the force of the circulation from the sac, without inflicting any injury on the diseased vessel. Their attempts however have not been attended with success, and the causes of failure are too well understood to render it necessary to insist upon them in this place.

In reflecting upon the process of nature by which the spontaneous cure of aneurism is effected, it

seemed to me that with a very little well directed aid from art, this process might be relied on for the cure of every species of external aneurism. For it seems to be well established, that the first and essential step in the spontaneous cure is the coagulation of the blood in the aneurismal sac, in consequence of the current through the ruptured artery being more or less obstructed. Sir Everard Home* and Mr. Scarpa† are of opinion that "this obstruction is often effected by a peculiar position of the aneurismal sac, by means of which the sac being compressed by ligaments and tendons, makes such a fold as to compress with an equable force (as in artificial compression) the trunk of the injured artery at its entrance into the sac," &c.

But it seems unnecessary to suppose any "peculiar position of the sac," for in every aneurism that has existed for any considerable length of time, the firm parietes of the sac would, if pressed down upon the artery, be sufficient to produce the obliteration of its tube, but that its area is distended by the whole force of the circulation. It follows therefore that when a cure is effected, whether by a process of nature or of art, the distending force, or force of the artery, must be diminished, or the resisting force or reaction of the sac must be increased.

* Transactions of a Society, &c. Vol. I. p. 139.

† Scarpa on Aneurism. Wishart's translation, p. 196.

To begin with the natural process.

When the cure is effected by nature, these changes may be produced in any of the following ways.

1. The force of the diseased artery may be weakened by a diminished action of the arterial system in general. So that the ordinary reaction of the sac upon the vessel may be sufficient to obliterate its tube, or the blood passing in a small and languid stream into the dilated sac, may there stagnate, or at least lose so much of its momentum as to deposit successive layers of coagula, which will at length convert the aneurism into a solid tumor pressing upon the artery*.

2. The pressure or reaction of the aneurism may be increased by its acquiring a sudden augmentation of bulk, in consequence of its coverings being attacked by inflammation. Accordingly in the generality of cases high inflammation, which in some instances has terminated in gangrene, has immediately preceded the spontaneous cure. Such cases are by no means of unfrequent occurrence. There

* It sometimes happens that nature deviates from the ordinary course of diseased operations, and forms a coagulum so complete as to fill up entirely the cavity of the sac, without their having been any previous stopping to the circulation by a vessel being rendered impervious, &c.

Baillie, Transactions of a Society, &c. Vol. I.

is at this moment in the Richmond Hospital under the care of Mr. Todd, a case of popliteal aneurism, in which this first step towards a spontaneous cure has actually taken place. The annals of surgery abound with such cases; but to illustrate this position it will be sufficient to refer to the instances of spontaneous cure of femoral aneurism related by Sir Everard Home*, and Guattano†, and of popliteal aneurism by Mr. Ford‡.

It is a curious fact, and affords a striking illustration of the wise provisions in the animal œconomy against accident and disease, that this first mode of the spontaneous cure seems to be confined to carotid and to internal aneurisms, which from their situation among soft and easily extensible parts are excluded from the benefits of what may be termed natural compression §; while in the cases of the spontaneous cure of aneurism of the extremities, that I have either myself observed or have found on record, sudden increase of pain, inflammation and swelling have uniformly preceded the mitigation of the symptoms, and have in fact been the first step towards a cure. I except those cases of aneurism which succeed to a wound pene-

* Transactions of a Society, &c.

† De Externis Aneurismatibus, Hist. V.

‡ London Medical Journal, Vol. IX.

§ See Mr. Petit and Dr. Baillie's cases of spontaneous cure of carotid aneurism, and M. Pelletan's and Mr. Hodgson's cases of spontaneous cure of subclavian and aortic aneurism.

trating the artery, for here the cure by a natural process is effected in a manner altogether different from either of those which I have attempted to explain.

When the cure of aneurism is attempted by a process of art, the intention is precisely the same, namely, to diminish the force of the artery, or to increase the reaction of the aneurism. The former is effected by the ligature of the vessel, the latter by the compression of the sac. In the present state of surgical knowledge, it is unnecessary to detail the objections to the treatment by compression, since the practice has fallen into disuse, and it is well known that the operation by ligature cannot be relied on when the coats of the artery are affected with steatomatous or earthy concretions; yet such a morbid condition of the artery is believed to be the predisposing cause, and is at all events the almost constant attendant upon aneurism. Ulceration of the artery, however, at the place of the ligature, has occurred, where no diseased condition of the coats could be detected, except at the place of the aneurism. In the case of John Lewis, a negro, who was operated upon by Mr. Birch, Mr. Cline (who examined the parts after death) observes, that "water injected by the iliac artery escaped freely from the wound, at the ligature where *the artery was open, and appeared to have ulcerated at that part.*" He adds, "on opening this part of the artery from the sac to the

ham, *it appeared quite sound and of its natural colour**."

But in fact secondary hæmorrhage is but too frequently observed to succeed the ligature of the femoral artery, even when the operation has been performed in consequence of a wound of that vessel, and where there was no reason to suspect a morbid condition of its coats†.

As my chief object is to shew the connection between secondary hæmorrhage, and the division of the internal and middle coats of an artery by the ligature, I omit the consideration of the severe constitutional affection, which, to a greater or lesser degree, constantly succeeds to this operation, and which, in some instances, has even terminated fatally‡. The experiments of Dr. Jones, which

* Transactions of a Society, Vol. I. p. 171.

† Deschamps, Observations sur la ligature des artères blessées.

‡ The constitutional affection would, in some instances at least, seem to depend on the extension of inflammation along the internal coat of the artery; but it would however appear, that the constriction of any living and sensible part by ligature is an injury that excites in general high constitutional irritation. I have witnessed two instances in which the application of a ligature to a hæmorrhoid proved fatal, and I once saw Tetanus induced by the application of a tight ligature to a large wart on the inside of the thigh.

In Mr. Travers's brilliant operation for the cure of an aneurism by anastomosis in the orbit, the irritation excited by the constriction of the carotid artery had very nearly proved fatal, and the death of Mr. Ramsden's patient after the ligature of the subclavian

have been so ably followed up by Mr. Travers, opened new and important views in the treatment of aneurism: for since many of the dangers attendant upon the constriction of a great artery, are referable to the continued irritation which is excited by the ligature, and to the ulcerative or sloughing process by which it is detached, it seemed reasonable to conclude that the mere division of the internal and middle coats, and the subsequent removal of the ligature before the sloughing process had commenced, would exclude some of the chief dangers of the operation.

But it is to be observed that the division of the internal and middle coats is the fundamental principle of this operation, and I have endeavoured to shew (1) that this division of the internal and middle coats is precisely the *kind* of injury which a diseased artery is least able to bear with impunity: accordingly secondary hæmorrhage *or even aneurism* * is not an unfrequent consequence of this operation.

And (2) that the obliteration of the artery can very certainly be effected by other and less hazardous means.

clavian artery, seems to be referable to this cause, rather than to the presence of a "polypous concretion in the cava superior which hung pendulous into the auricle."

* See p. 9. Warner's case, &c.

According, however, to the views which I had taken of the process of nature in the spontaneous cure, it appeared to me that a cure might be effected by a process of art, which should in no degree endanger the integrity of the artery. Intermediate compression, or compression from without, (maintained for a sufficient length of time to allow the blood in the aneurismal sac to coagulate) had been tried and was found ineffectual. It remained but to try the effect of the immediate compression of the tube, regulating, however, the operation in such a way as to employ no greater degree of pressure than would be sufficient to interrupt the circulation of the blood, and to maintain it no longer than might be required for the completion of the process of coagulation. Whether or not this slight and temporary compression would be competent to effect the obliteration of the artery at the place of the ligature was a distinct consideration. Such a result might perhaps be inferred from Experiments I. and II.; but its occurrence could not be considered as necessary to the success of the operation, which is sufficiently assured from the moment that the blood has coagulated within the aneurismal sac.

I shall now briefly state, in the order in which they occur, the changes which it appears to me are likely to be produced by an operation conducted upon the above principles.

In the first place, it must be considered that the aneurismal sac is, at the instant preceding the obstruction of the artery, distended not only by the whole force of the circulation (whatever that may be) but by that force multiplied as often as the area of the opening of the artery is contained in the internal surface of the sac. Without entering into a calculation, the *data* of which are so uncertain, it will be admitted that the muscular and ligamentous parts by which the sac is invested, must be distended far beyond their state of rest, or that natural degree of tension into which they have a constant disposition to return. On the instant, then, that the blood is obstructed in the artery, the coverings of the sac, relieved from the force by which they were distended almost to bursting, will suddenly react; a part of the fluid contents of the aneurism will be driven back into the flaccid and nearly empty artery, and the firm parietes of the sac, pressed down upon the unresisting tube, will obliterate its area. In this way, all communication being cut off between the artery and the sac, the blood stagnating in the aneurism will gradually coagulate, the more fluid parts will be absorbed, and the more solid will be condensed by pressure, until the whole sac and its contents are reduced to the situation of a firm tumor pressing upon the artery. The subsequent changes which terminate in the obliteration of the arterial tube, by the adhesion of its surfaces, and the removal of the coa-

gulated blood by the process of absorption, are well understood.

Thus it would appear that when a ligature is applied above the seat of an aneurism, the first and essential step towards a cure is effected by the coagulation of the blood in the sac. The obliteration of the artery in consequence of the action of the ligature upon its coats, is a subsequent process, which can in no other way influence the success of the operation, than as it may give rise to secondary hæmorrhage or to constitutional disturbance. Let us now examine how far this opinion with respect to the changes which are induced by the temporary compression of the artery above the seat of aneurism, is conformable to the observations of others. Mr. Hodgson, whose extensive researches and accurate observations have thrown so much light on the pathology of aneurism, has remarked that "in *all* the preparations which he has examined, and in all the cases which he has met with on record, in which the parts were dissected after a complete and radical cure of aneurism had been effected by the modern operation, the cavity of the sac has been found obliterated, *and both extremities of the artery, from which the aneurism arose, were also obliterated* to the origin of some important branch." He excepts Mr. Astley Cooper's case*, "in which the femoral artery was converted into a solid cord from the origin of the profunda to the commence-

* Medico-Chirurgical Transactions, Vol. II.

ment of the tibial arteries. But in all the other dissections after the modern operation for popliteal aneurism, the femoral artery has been found to be obliterated for the space of three or four fingers' breadth at the place where the ligature was applied. *Below that part it was pervious, and continued so for some distance, when the obliteration again commenced, and continued throughout a considerable extent of the popliteal to the origin of the inferior articular arteries.*" In Mr. Hunter's first patient, who died fifteen months after the operation, "the femoral artery was impervious from its giving off the arteria profunda as low as the part included in the ligature. Below this part the femoral artery was pervious down to the aneurismal sac, and contained blood, *but did not communicate with the sac itself, having become impervious just at the entrance* *."

Mr. Hodgson refers to five cases in which similar changes were observed to have taken place. The simple explanation of these facts is that the artery is obliterated at the two points of compression, namely, at the place of the ligature and at the place of the aneurism. The occurrence of pulsation in the ham after the artery has been tied on the fore-part of the thigh, would seem to militate against this doctrine, but it is to be observed,

1. That pulsation corresponding with the action of the heart cannot be communicated by the ob-

* Transactions of a Society, &c. Vol. I. p. 153.

structed artery to the blood in the sac, since that portion of the artery contained between the ligature and the tumor can be filled only by the refluent blood pouring in slowly from anastomosing branches.

2. The absolutely inactive state of the artery between the ligature and the sac can be satisfactorily ascertained; for by laying the finger upon the naked vessel, immediately above and below the place of the ligature, it will be found that a strong pulsation exists in the upper, and none whatever in the lower portion of the vessel. This inactive state of the artery beyond the ligature is, however, to be observed only in cases of aneurism; for in the healthy carotid or femoral artery of a sheep or horse, a pulsation can be felt on either side of the ligature; it is, however, much more distinct in the portion of the artery between the ligature and the heart.

3. In Mr. Pott's case, as related by Sir E. Home, pulsation recurred in the ham after the ligature had been applied to the popliteal artery *immediately above the aneurismal tumor.*

The conclusion is, that secondary pulsation must be attributed either to the imperfect obstruction of the arterial tube by the ligature, or to the opening of some large anastomosing branch into the cavity of the sac. It would appear from the following cases, that the temporary compression of an artery,

upon whatever principle it may act, may be successfully employed for the cure of aneurism.

CASE I.

On the 12th of October, 1814, Francis M'Donnell, of the Tyrone regiment, was transferred from the regimental hospital at Kilbeggen to the King's military infirmary near Dublin. I received the following memorandum respecting his case from Surgeon Sinclair: "For three months past, M'Donnell has complained of pain in the calf of his leg, which did not interfere with the discharge of his duty until the night of the 20th of September last, when he was seized, while asleep on the guard-bed at Longford, with the most excruciating pain in the ham, which he found upon examination to be swelled and throbbing violently, &c." The only additional circumstances which it seems necessary to notice are the following. He was about 39 years of age and of a robust make; his countenance, however, was sallow, and expressive of the greatest anxiety. His pulse was upwards of 120, and remarkably full and strong. He had not slept for many nights, and was occasionally delirious. The aneurism was of an unusually large size: it not only distended the ham to the utmost, but forced up the calf of the leg, and formed a large and pul-

sating tumor under the fascia of the vastus internus muscle, immediately above the inner hamstring. Forty ounces of blood were taken from his arm, his bowels were freed, and an evaporating wash was applied to the tumor. He passed a better night, and at half past twelve on Saturday, the 14th of October, the operation for aneurism was performed in the following manner: the femoral artery was laid bare at the usual place by an incision not exceeding three inches in length, and a tape, one-eighth of an inch in breadth, was passed under it by means of the aneurism needle. The ends of the ligature were passed through the holes in the foot of the "presse artère*," and then crossed through the hole in its stalk. The artery was gently compressed by drawing the two ends of the ligature in an opposite direction, until Mr. Stringer†, who kept his hands applied to the tumor from the commencement of the operation, announced that the pulsation had ceased. The ligature was then secured by passing a small peg of wood through the hole in its stalk, and a small dossel of lint was laid on each side of the instrument in order to steady it in the wound (a precaution which I have ascertained to be unnecessary), and the sides of the wound were gently approximated by two or three strips of adhesive plaster. The operation was completed in about twelve minutes. The man made no complaint when the ligature

* See Plate I. fig. 2.

† Surgeon to the King's Infirmary.

was drawn, and when he was laid upon his bed he said "he was now as well as ever." In about twenty minutes, however, he complained of an excruciating pain in the calf of his leg. He was ordered 35 drops of laudanum. At half past two o'clock he still complained. I determined, therefore, to relax the ligature as well to ascertain how far the pain was excited by its pressure, as to observe what progress had been made in the process of coagulation. The peg was withdrawn from the hole in the stalk of the instrument, and the ligature was thus left at liberty to yield to any impulse that it might receive from the artery. I watched for five minutes with my hand upon the tumor, and as the pulsation did not recur, the peg was replaced, so as to secure the ligature at the degree of tension which it now possessed. The pain abated immediately; but in about ten minutes it returned with nearly equal severity, but it was now confined to the ankle and heel. At about six o'clock in the evening he vomited freely, and the pain immediately abated. His pulse at eight o'clock in the evening was 84, full and soft. Temperature of the right foot 86 degrees, of the left 82. Sunday, 15th, (noon) had considerable pain during the night, but at five, *a. m.* it ceased altogether, and he slept for two hours. He is now free from pain or uneasiness of any kind, pulse 96.: has had four stools from some purgative medicine which he had taken in the morning. He says that "the limb felt cold until two in the morning, it then became warm

and comfortable." Temperature of the left foot behind the ball of the great toe, 84 degrees; at the great toe itself, 80.1; of the right foot and great toe, 77 degrees. I relaxed the ligature completely: no pulsation at the ham. (Monday, 16th) half past eight o'clock, *a. m.* pulse 65: slept six hours tranquilly; is quite free from pain or uneasiness of any kind: no pulsation in the tumor: pulse 80, soft and full: temperature of each foot at the toes, 80 degrees: the instrument lies loosely in the wound, indicating by its motion the pulsation of the artery on which it lies. (Tuesday, 17th, noon) slept eight hours: makes no complaint: I withdrew the instrument and ligature without difficulty and without inflicting the slightest pain: the lips of the wound still further approximated by slips of adhesive plaster.

From this day every thing with respect to the aneurism proceeded in the most favourable manner. On the 14th day from the operation the man went about the ward on crutches. The state of his general health, however, did not keep pace with the improvement in the local disease. For many weeks afterwards he was harassed by severe pains in the calf of the leg, the ankle, and heel, accompanied with great weakness of the limb. The pain at length subsided, and he went to his regiment about two months after the operation. Here a new train of symptoms supervened, which but too clearly pointed to the existence of an aneu-

rism of the aorta. I was not, therefore, surprised to learn that a few months afterwards he died suddenly while on furlough among his friends.

CASE II.

On Monday, 27th of February, 1815, I was invited by my friend Mr. Dease to assist at an operation for popliteal aneurism: the following were the principal circumstances of the case. Mr. Smith (the subject of the disease) was about 26 years of age, and had hitherto been remarkably healthy. In August last he perceived a small pulsating tumor in the ham, which at first was attended with but little pain and only with occasional lameness. In December last, it began to increase rapidly, and the pain became intense. In January he took to his bed, and when Dr. Dease visited him for the first time in the beginning of February, he found him greatly emaciated: his pulse was 126, and remarkably full and bounding. He said, "he felt as if his whole body was shaken by the strong pulsation of his arteries." A few days before, Mr. Adrian had, by a contrivance, similar to Sir W. Blizard's, endeavoured to compress the artery from without, but by no force that could be borne was he able to stop the pulsation at the ham: the attempt was therefore abandoned. The operation was performed by Dr. Dease at 12 o'clock on

Monday the 27th of February. The artery was laid bare at the usual place, and the "serre artère" was applied as in the case of M'Donnell. Mr. Smith was not sensible of any peculiar sensation when the artery was compressed by the ligature. At half past five, *p. m.* the ligature was completely loosened. In about a minute, a deep and obscure pulsation was discerned in the tumor: it became more distinct at every moment. The ligature was immediately tightened and the pulsation ceased. At half past twelve on the following day (28th, 24 hours after the operation and 19 since the circulation had been last interrupted) the ligature was again completely loosened. We waited with great anxiety for nearly an hour, but the pulsation returned no more. It was determined, however, that the instrument should be allowed to remain in the wound, and an intelligent assistant who remained constantly in the room was directed to tighten the ligature in case the pulsation should recur. His pulse was 100 and much more soft: he said he had a sensation of numbness but not of coldness in the limb. Wednesday (29th) quite free from pain: slept until six o'clock this morning; he had then some bilious vomiting, but his stomach is now settled. At half past five o'clock, the instrument which lay loose in the wound was withdrawn without difficulty or pain. From this period his recovery was rapidly progressive: in less than three weeks the wound was healed, and the tumor was so much reduced as to be visible only in the

most extended position of the limb. In April his health was perfectly re-established, and he was able to walk abroad, supporting himself on a single crutch, and laying the foot lightly to the ground.

P. S. Since the preceding observations were written, a case of the greatest interest has occurred in one of the hospitals of this city, and which I am permitted to communicate to the Society.

"On Friday the 23d of February, 1816, the femoral artery was tied (in the manner recommended by Mr. Travers) for an aneurism of the posterior tibial artery. On Monday the 26th, the case appeared to be doing well, all pulsation having ceased in the tumor, and the temperature of the limb being natural, a slight attempt was made to loose the knot, which proving ineffectual was not persevered in. On Wednesday the 28th, at eight o'clock *a. m.* the ligature, appearing to lie loosely in the wound, was withdrawn without resistance, the loop remaining perfect: a violent hæmorrhage came on at one, *p. m.* the same day.

"The artery was secured again about three inches higher up. No alteration in the temperature of the limb followed this operation. On Friday night the patient became delirious, and died on the following morning."

On dissection the artery was found to be completely divided at the place of the first ligature: its extremities had retracted to the extent of three quarters of an inch. The mouth of the upper extremity of the tube was circular, its area was not contracted, nor were its coats thickened; but it was imperfectly obstructed by a coagulum about half an inch long, which seemed to adhere partially to the internal coats. There was no appearance of lymph having been effused from the cut edge of the divided coats. The lower extremity of the tube presented similar appearances, with this difference, that it was more perfectly obstructed by a coagulum.

It would seem then,

1. That the division of the internal and middle coats had been effected in the usual way by the application of the ligature.

2. That the complete division of the tube in consequence of the sloughing or ulceration of the external coat, had taken place *at least* on the morning of the fifth day; for, on that day, the ligature with its loop lay loosely in the wound, and was withdrawn without resistance.

3. That, *after the division of the tube*, hæmorrhage was delayed by the presence of a slightly adherent coagulum.

The striking feature in this case is the occurrence of hæmorrhage on the fifth day; how far this accident is to be attributed to the attempts, however cautious, to withdraw the ligature from an artery already weakened by the division of its internal middle coats, I do not pretend to determine; but that a vessel so circumstanced is not in a condition to bear violence or even disturbance of any kind, will I believe be readily conceded.

A SKETCH

OF THE

MEDICAL HISTORY

OF THE

FIRST BATTALION

OF THE

FIRST REGIMENT OF FOOT GUARDS,

DURING THE WINTER OF 1812-13.

By JOHN BACOT, Esq.

SURGEON TO THAT BATTALION.

Read April 30, 1816.

I HAVE long hesitated in presenting the following sketch of the Medical History of the Battalion to which I belong, being doubtful whether the facts I am about to relate, would prove sufficiently interesting to warrant my taking up so much of the Society's time; but though I cannot flatter myself that the information I have to give, is either very new or important in a medical point of view; I am not without hope that the detail of our misfortunes may afford some instruction to those especially who are engaged in the medical department of the army, and perhaps tend in some degree to illustrate the

history of those fatal diseases, fever and dysentery, which without any exaggeration may be said to be infinitely more destructive to an army than the sword of the enemy. In giving these details, it will be necessary to mix with them a good deal of what cannot strictly be called medical matter, for as these complaints, and indeed almost all the diseases of the soldier abroad, are materially affected by and dependent upon the nature of the particular service in which he is engaged, the most minute and accurate medical history would be defective, unless these circumstances were taken into due consideration; and would certainly be productive of no practical advantage to those who at any future time might be placed in similar situations.

The first battalion of the first regiment of foot guards, embarked for Spain on the 14th of September, 1812, and consisted at that time of 1,499 men, including non-commissioned officers; and perhaps without exception, both in point of appearance and health, this battalion may be said to have quitted England in as complete a state as any regiment that ever left its shores; yet for the severe service in which (with the interval of a few weeks only) it was afterwards engaged, its composition may be said to have been thoroughly, though unavoidably, defective, more than one half of the battalion consisting of men who had volunteered from the militia in the spring and summer of the

same year, or of recruits who had never been on service; and the remaining 600 taken from among those men of the battalion who had been in Walcheren; and as far as could be done, selected from those who had suffered least from the marsh fever that committed so much havoc in that unfortunate army.

It is unnecessary now, I believe, to insist upon the unfitness of men just received from the militia for the duties of field service. Accustomed to full living, warm clothing and comfortable quarters, and knowing nothing of the difficulties of actual service, such men are predisposed to disease in no common degree; and to this may be added the unfortunate lot that awaited this battalion upon joining the army at Duenas on the 25th of October, after marching 300 miles through Gallicia and Leon, arriving at the commencement of the retreat from Burgos, which they were not at all prepared to expect. Those who witnessed the depression produced by that untoward event, will not hesitate to pronounce it to have operated as a powerful moral cause, that tended to hasten the evil that ensued.

During the march to Duenas, which commenced from Corunna on the 30th of September, the battalion had preserved its health wonderfully, and we arrived at the above-named place (Duenas) with only 58 sick of all descriptions, and this in-

cluding some cases of the venereal disease, that made their appearance on the road. One man only died on the route, though the weather during part of this time was dreadful, and we were enveloped in snow as early as the 14th of October, in crossing the Gallician mountains. From Duenas our retreat was continued with intervals of some days to the neighbourhood of Salamanca, during which the men were exposed to a very hot sun throughout the day, and lying on the ground at night with only the protection of their blankets, the nights being extremely cold and attended with a very heavy dew. And now it was that disease began to shew itself seriously, at first chiefly in pulmonic affections, and some few cases of acute dysentery, the latter of which, by the time we reached Villares (near Salamanca), became the prevailing disease. It was here we lost our first man, and from this place, and previously to our reaching it, we sent 160 men to the general hospitals. Very little medical assistance could be rendered to the patients under these circumstances, and as the army was continuing its retreat, they had to travel to the hospital stations, either on mules or in carts, occasionally exposed to very severe weather; but these were evils inseparable from our situation at that time. After remaining one week in cantonments at Villares, the movements of the enemy once more obliged us to retire, and in four days of severe marching, dreadful weather and much privation, we reached the frontiers of Portugal, where we were again can-

toned in the miserable village of Carpio for ten days, and then by easy marches, unmolested by the enemy, reached Vizeu on the 7th of December. From Carpio, and on the march from Salamanca, 205 cases were sent to the general hospitals; these were chiefly dysenteries, and will tend to shew the rapid increase of sickness in the short space of one fortnight. Another circumstance must here be mentioned as materially contributing to the many that were operating as causes of disease. This battalion, on commencing the march from Corunna, had received its pay to the 24th of September, whereas that of the rest of the army had been slowly and gradually getting into arrears, so that when we joined them in October, we found that they were subsisted only to the 24th of July. Hence it is evident that even if the issues of money could have been made with the greatest punctuality, that three months must elapse before we could become entitled to receive our pay for the month of October; but as from the difficulties necessarily attending our situation, the payments could be made only every five or sometimes every six weeks, the period of time that elapsed before our October pay became due, was even much greater than that which I have mentioned. The soldiers so situated, with nothing but their mere rations to subsist upon, notwithstanding every exertion made to prevent it, too frequently disposed of many articles of their cloathing, and even their blankets to purchase other provisions, and thus it was that the majority of them

reached Vizeu in a state of miserable deprivation, dirty in their persons, worn down with fatigue, wasted most strikingly in flesh, and depressed in spirits. To make the climax complete, the weather for the first fortnight after our arrival at Vizeu was so incessantly rainy, as in a great measure to preclude those frequent inspections and parades, so necessary to rouse the attention of the soldier, and promote cleanliness at such a time. The men were quartered by threes and fours in the houses of individuals throughout the town, and I did not discover that fever was at all prevalent among the inhabitants previously to our arrival. The situation of Vizeu is open and healthy, and it had proved remarkably so a few winters before, when the second brigade of guards was quartered there, and, as I am informed, scarcely lost a man during that period.

I have already mentioned that from the 25th of October to the 7th of December, somewhat above 360 men had been sent to the various hospital stations; but this was trifling in comparison with what followed. Our daily admissions at Vizeu being from 15 to 20 upon an average, we were obliged to open four regimental hospitals in succession, in which for the first six weeks we accommodated all the cases that occurred; but as the evil continued to extend itself, we were afterwards obliged not only to continue to admit as many as possible into our own hospitals, but also to transfer

421 cases to the general hospitals established in the town. The general result of our admissions during our stay at Vizeu from the 7th of December, 1812, to the 3rd of March, 1813, was 1018 men admitted in the regimental hospitals, of whom 221 died, being rather more than one in five of the above-mentioned 421 transferred; the proportion of deaths I have no means of ascertaining, but I believe I may say it was not materially different from that which occurred among ourselves.

I am now arrived at the most distressing and difficult period of my relation, for whilst I attempt to give a faithful account of the mode of attack, and the usual progress of the disease, I must at the same time confess how vain were all our endeavours to arrest its progress, and how powerless, in most instances, were all our remedies to bring it to a favourable termination. The patients usually came to the hospital complaining of chilliness, languor and depression, both of strength and spirits; the countenance wan and melancholy, the pulse small, frequent and tremulous, and the surface of the body unusually cold to the touch; giddiness of the head was a frequent complaint, and a deep and constant sighing was an universal symptom; yet there were none of the common attendants of the first attack of fever, no violent headache, nausea or thirst, no accession of heat, or marked rigors in the first instance. I have seen numbers of men brought to the hospital so attacked die in

24 or 36 hours after their admission without a prominent symptom, insensible to every kind of stimulus, and never having any accession of heat, or increased action of the vascular system, from the moment of the attack to the hour of their death. In many men of very robust habit, the disease assumed more of the common forms of fever, and very soon put on the typhoid character, with parched tongue, low muttering delirium, and terminating in some instances in a suffusion of bile over the whole surface of the body. In all there was a great disposition to relaxation of the bowels; in some instances the restraint rendered necessary by the delirious state of the patients, such as fastening down the hands, produced a speedy mortification of those parts pressed upon by the ligatures; and another and by no means uncommon circumstance was gangrene of the toes and feet, which the patient often forgot to mention, unless inquiries were made upon the subject. In numerous instances dysentery was either conjoined with the original disease, or preceded it; but it too often happened that a sudden and spontaneous diarrhœa carried off the patient rapidly, even when apparently becoming convalescent; and in no instance where purging to any extent occurred do I remember to have seen a man recover. I am sorry to be obliged to confess that I know of no class of remedies, or particular plan of treatment, by which this disease was materially affected. Oppressed by the numbers continually thrown upon our hands, and limited as are

the means of the medical establishment of any regiment to meet such an emergency, our first endeavours were applied to afford our patients good warm lodging, dry clothing and as frequent changes of linen as possible, taking care at the same time to prevent their being crowded; the fumigation of nitrous acid was also employed frequently in all the wards. The cases that presented themselves to us in the first weeks of our residence at Vizeu were completely those of exhaustion, and our practice was to give volatile alkali with bark, aromatics and spices with wine frequently, but not in great quantities at a time, paying attention to the state of the bowels, or any other symptom that might occur. Many cases so treated recovered, but their convalescence was tedious in the extreme, and relapses were frequent and too often fatal.

In no instance, while at Vizeu, did I feel myself justified in taking away blood, or using the cold affusion; though great benefit was afterwards derived from the latter remedy, when the disease assumed a different character, which it did previously to our reaching Oporto in the month of April.

This was the most aggravated form in which fever shewed itself; but afterwards the true typhus became more prevalent, and spread to the ward serjeants, to the orderlies, and indeed to most of those who had much communication with the sick, so that eleven hospital serjeants were taken ill in

succession, two of whom died, as well as several of the orderlies. The mortality in these instances, however, bore but a trifling proportion to that which occurred from the complaint I have mentioned above, in which death took place so speedily, and the constitution appeared so entirely broken down, that no interval of time was allowed for the operation of medicine.

The condition of the battalion and a consideration of its preceding situation and circumstances, led us to apply ourselves at once to the root of the evil; as the affording those not yet attacked better food, and renewing the clothing to such as were but scantily supplied, might either prevent their being attacked at all, or so invigorated the system as to enable it to overcome the disease if it did assail them. Our success in these endeavours, and the striking fact of the total exemption of every officer (except one) from fever, and indeed of every officer's servant, who from their situations were not only less exposed to fatigue but better fed, sufficiently proved, if indeed such proof were necessary, that we were not mistaken in our conjectures as to the origin of the complaint. Still more striking was the exemption of almost all those men who, as mechanics, or by labour, were enabled to earn money sufficient to procure them necessaries independent of their rations: and upon this was founded the judicious arrangement of distributing to each man a small pro-

portion of money daily, in order to procure a breakfast, or other diet unconnected with his daily allowance. I must farther observe of the officer whom I have before stated to have suffered from fever, that his was a case of typhus mitior, from which he gradually recovered: and it ought not to be forgotten, that as he was the only officer taken ill of fever, so he also was the only one who partook entirely of the fatigues of the men, by marching on foot with them from their first landing at Corunna, until he was taken ill in Portugal.

The second period of my melancholy history may be taken up from the time that the battalion removed from Vizeu in the first week of March to their arrival at Oporto on the 3rd of April, a period of about four weeks. We had been twelve weeks resident at Vizeu, and had entered that place with nearly 1100 men; we marched out with 358 only; 221 having died in our own hospitals, a much greater number at the various hospital stations, and the remainder being left sick in the general and convalescent hospitals of the town. The return of one company which was the most unhealthy, will exemplify what I have said above very strikingly: this company consisted of 119 men upon our arrival at Vizeu; of these only 12 escaped the attack of fever, and quitted the place with us; seven of the twelve were officer's batmen, and two had worked as regimental tailors.

Fever still followed us in our new cantonments though its character was entirely changed; it now commenced its attack with the common symptoms of synochus, with headache, nausea, shivering, succeeded by intense heat; and after well emptying the primæ viæ, the cold affusion was generally employed. Of 48 cases so treated every one recovered perfectly, and in by far the greater number of instances the fever yielded to one affusion; in some few cases it was repeated as often as three or four times, when the accession of heat seemed to require it. While stationed in these villages the result of our admissions was 89 cases of fever, 14 of whom died, being rather less than one in six; but these were chiefly relapsed cases, and upon our removal to Oporto 48 additional ones were transferred to the general hospital. Our march to Oporto was performed by very deliberate and easy stages, so as rather to benefit than fatigue the men, who evidently gained ground in health every day: indeed the order that sent us to Oporto may justly be hailed as the commencement of our healthy era, for from the day of our arrival there until the 29th of June, nearly three months, although 229 cases of all kinds were admitted into our hospital, not one death occurred, notwithstanding we had been joined by many convalescents, and though both among these as well as among the remnant of the battalion that arrived with us, relapses were very frequent. But so different was the condition of the battalion become, that we performed the

march from Oporto to the Pyrenees with the loss of only one man by apoplexy, and left only eight sick upon any part of the route; a distance of certainly not less than 500 miles. There was a considerable difference in the proportion of sickness that took place between the old soldiers and those who had been received from the militia, of which the annexed return will however afford but an imperfect notion, inasmuch as it was drawn up in the month of January, and consequently before the disease had run its course; but the result as far as it does extend, was this; of 610 old soldiers, 198 were taken ill and 48 died; of 487 militia-men, 203 were attacked with fever, and 51 died.

On the subject of dysentery I have very little to say, but in the later periods of the Peninsular war, I have had occasion to practise and approve of the plan of treatment recommended by Dr. Somers, and mentioned by Sir James Macgrigor in his interesting paper, inserted in the last volume of this Society's memoirs. But in that period of time to which my history is confined, dysentery seldom occurred as a distinct affection: it was conjoined too frequently with the most aggravated form of fever, and in no instance did I feel myself warranted to use the lancet. I have only one more observation to offer, which is this: without entering into the arguments upon the much contested subject of contagion, this was the second time that it fell to my lot to witness the ravages of fever en-

suing on service of extreme rigour and privation. And as far as I can collect from others or from my own experience, a fever of the typhoid character is the usual consequence, and always makes its appearance in a greater or less degree, at the termination of such campaigns as I have attempted to describe. How far this may countervail the opinion that is held by some of its being always the result of a specific contagion, I do not take upon myself to decide.

MICROSCOPIC OBSERVATIONS

ON THE

STRUCTURE OF BONE.

By JOHN HOWSHIP, Esq.

Read June 25, 1816.

THE diseases of bones appear to be particularly curious and interesting; for in the diseased as well as in the healthy condition of these parts of our frame, we see nature putting forth all her ingenuity in subjecting to the laws of animation those principles, that being related more immediately to the earths, are less disposed than softer materials to yield to the various operations necessary for the regulation of all living matter. Thus we see bone under various circumstances taken up from one part and laid down in another. Where from accident or disease the soft parts surrounding a bone are so injured that the nutritious artery perishes, a portion of the bone, more or less considerable, dies; and while that part of the cylinder which has lost its vitality is undergoing the process of separation, another process of equal importance is

commenced, the object of which is to prevent the ill consequences that must otherwise ensue from the weakness and deformity of the limb. A new frame-work of ossific matter of a cylindric shape is produced, surrounding the old bone, and connecting itself to its extremities, which still retain their living principle. By this salutary effort of the constitutional powers, a limb is sometimes preserved, and after having sustained the loss of nearly the whole of the bone originally provided for its support, has in this way eventually recovered complete activity and strength.

But notwithstanding we may view with admiration the infinite wisdom with which the animal machine is constituted, it is impossible to contemplate the changes induced by disease, without feeling the want of more information than we yet possess, regarding the healthy structure and economy of these parts; and it has also appeared to me that many questions relating to the constitution of healthy bone can never be determined with certainty, unless we endeavour to ascertain those secret provisions, by the agency of which nature has appointed and regulated its first production and subsequent growth. On these grounds I was induced some time ago to commence my inquiries by some experiments on the formation and growth of bone, which the Society have done me the honour to publish in their Transactions *, and I now propose

* See Vol. VI.

continuing the series of observations, by considering the structure and organization of bone when it has attained its full growth, with a view to determine more accurately the nature and operation of those powers by which the condition of bone is changed when under the influence of disease.

In the former paper I demonstrated several new facts with relation to the structure of bone and cartilage, which appeared to me to possess considerable importance in a physiological point of view. It was there shewn that the generally received opinion as to the first rudiments of the cylindrical bones being formed upon cartilage was erroneous, they being, in fact, deposited as a secretion from the fine vessels of the periosteum; and that cartilage is subsequently formed to hasten the progress of the work, as well as to determine its figure, where it becomes necessary for the ends of the bones to be accurately adapted to each other in the production of moveable joints. One of the purposes of the cartilage of growing bone was stated to be that of affording convenient lodgment to membranous sheaths which lined the cavities of canals, traversing the structure of the cartilage down to the new bone; that these membranous sheaths were capable of circulating the blood very freely (although, as I then suspected, not in vessels*),

* From more recent examinations of these membranes, where the arteries were injected with very fine quicksilver, I no longer entertain a doubt that the opinion I had partly formed at the time my

and were evidently secreting surfaces, furnishing a copious supply of a peculiar mucilage. The nature and arrangement of the foramina upon the ossific surface were also pointed out, and by prosecuting the inquiry through the various orders of animals, it was proved that the same beautiful simplicity that is known to pervade most of the operations of nature, extends also in all probability to this; for in every instance there was the same principle manifested, and the same means employed for the accomplishment of the end, wherever bone was to be produced.

Some objections, it is true, have been brought forward against the accuracy of the above experiments; I cannot however but regard those doubts which have been expressed as to the correctness of the microscopic appearances by gentlemen, for whose liberality of sentiment, as well as extensive knowledge in anatomy and physiology, I feel the highest possible degree of respect, as a strong testimony in favour of the originality of my observations. Subsequent to a paper of mine on this subject having been read before the Royal Society, I took some pains to remove these objections; and it was suggested by a

my former paper was written, is well founded; as I am convinced that the blood is diffused through the finely reticulated structure of the membranous sheaths; the texture of which, although it is extremely fine, must possess considerable strength: for in no instance have I ever been able to trace any appearance of rupture or extravasation in these parts, when injected.

friend that the most satisfactory mode would be to get some person, whose habits of constant application to the microscope rendered him competent to the task, to examine my objects in his own way, and to produce his own figure before seeing mine. This was done. I was favoured with an introduction to Mr. Bauer, the extent, the interesting nature, and the success of whose researches with the microscope are well known, and highly appreciated by the scientific world.

He examined most of the specimens, compared them with my drawings, and found them correct. Of one specimen in particular, that seemed most likely to have given an inaccurate figure, he was so obliging as to make a sketch from by his own microscope, with a micrometer, before seeing the drawing I had previously made by the solar microscope, and upon comparing them together, the size and figure of the corresponding parts upon each of the two drawings were found to be accurately the same *.

* The following is an extract of a letter I subsequently received from this gentleman:

"*Kew, January* 10, 1815.

"I acquainted him with your having called on me some weeks ago, and of your having shewn to me several microscopic drawings on anatomical subjects you made from nature, and that by your desire I examined and compared them very minutely with the natural objects they represented, and that I found them in every

To give every possible facility to the confirmation of what has been asserted, I have endeavoured to state the mode in which each specimen was prepared so clearly, that any person disposed to inquiries of this nature, may with very little trouble satisfy himself how far my observations have been correct, by comparing my illustrations with such specimens as he may himself obtain.

With regard to the subject of the present paper, it appeared that examinations into the structure and economy of perfect or full grown bone should be made from the most heavy and compact portions of bone, where it is found to be most distinct from the soft parts; upon this principle the solid sides of the cylindrical bones have been selected for this inquiry, in preference to the spongy and cancellated extremities. The *medullary cavity* of a cylindrical bone is understood to be the space within the circle formed by a transverse section of the cylinder; which space is more or less occupied by a finely reticulated ossific structure, the interstices of that structure being charged with soft medullary matter, deposited in fine membranous capsules;

every particular *true* and *correct;* and that by your particular request I made a sketch of one of those objects with my own microscope, and according to my usual method, before seeing your drawing of the same object; the result proved completely satisfactory, the sketch I then made corresponding exactly with the drawing you had made a long time ago," &c. &c.

and by the *canals in bone* it is intended to express those fine tubes, principally longitudinal, which pass through the compact and solid structure of the cylinder of the bone; which canals have numerous lateral communications with the internal or medullary cavity, and also with the external surface of the cylinder. By a *transverse section* of a bone is meant such a one as will expose the section of the medullary cavity, together with those of all the longitudinal canals situated in the solid structure of that part of the cylinder; but a *longitudinal section* passes through the centre of the bone, dividing it in a plane parallel to the axis of the cylinder, and consequently not only brings into view the longitudinal extent of the canals, but also their occasional communications, internally with the medullary cavity, and externally with the surface of the bone covered by the periosteum.

In the year 1811, I first examined some transverse sections of the humerus, from the human subject, in the compound microscope. In every instance I found numerous small canals of a circular figure passing in a longitudinal direction, but none of them were empty; the larger canals being thickly incrusted with an opake whitish coloured matter, which on examination with the point of a needle, as it lay under the microscope, was found to have the consistence of spermaceti, while the smaller canals were apparently filled up with the same substance, the situation of the canal being

distinguishable only by the brighter colour of its contents compared with the other parts of the surface of the bone. The success of these attempts to ascertain the structure of bone was, however, somewhat uncertain, from the mode in which these specimens were necessarily prepared for examination. The cylinder was first divided with a saw, and the section rendered as smooth as possible with a fine file, but in both these operations the bone-dust was to a certain degree apt to work into the orifices of the canals, so as to obscure the characters of the surface. With a view to remedy this inconvenience, the surface of each section was subsequently pared with a very sharp knife, by which means the face of the bone was in many instances rendered much more distinct.

By these examinations it appeared that all the canals in bone are destined to contain medullary secretions, and not merely to transmit vessels, as has been frequently asserted. But although it was pretty manifest that the proportion of medullary matter was considerable, there was yet no appearance by which to form an estimate of the proportionate space allotted to the vessels circulating the blood, compared with that appropriated to the matter secreted into these cavities. With a view to determine this point, a great number of transverse sections were taken from the recent humerus of an ox; and the surfaces of these sections, prepared as above, were examined in succession. Up-

on all of them the divided extremities of numerous blood-vessels were apparent; but this surface had, in most instances, been so disturbed in the preparation, and the colour of the medullary matter was to all appearance so nearly that of the bone itself, as to render the investigation rather difficult. Upon the surface of one section I found a very clear view of several oblique sections of arteries that were seen distinctly taking a certain course, although it was not possible to discern the boundaries of the canals in which they were contained. However, as these vessels were just large enough to be visible to the naked eye, I included them in a figure marked with a graver upon the surface of the bone, in a space of one-eighth of an inch square, and then made an accurate drawing of them by the microscope, distinguishing the more intense points of colour, where I supposed the vessels passed down into the substance of the bone, from those where the colour gradually became faint, which was attributed to the vessels being at those points obliquely divided upon the face of the section. The piece of bone was then removed, it was gradually subjected to the action of a strong clear fire, and calcined, so as completely to remove all the animal matter. The surface of the bone, somewhat disturbed by this process, was again rendered smooth by means of a fine file, without erasing the engraved line. The dust was then brushed out with a camel-hair pencil, and the piece replaced in the microscope. The clear view which was now afforded of

those canals in which the vessels had been before seen, the correspondence between the appearances of the blood-vessels and the direction of the canals, and the small proportion in point of magnitude which the blood-vessels bore to the canals in which they were contained, afforded a contrast as interesting as it was satisfactory.

Continuing the examination of the recent appearances in bone, I did not give up all hope of meeting with some one section more satisfactory than the rest, one where from the face of the piece being more perfectly than common shaved down to a new surface, I might be enabled not only to see the blood-vessels, but also to distinguish the proportional magnitude of the canals, and their medullary contents. In this expectation I was eventually not disappointed; for in one instance, and in one only out of a great number, I obtained a very fine view of the canals with the whole of their contents, and found that whatever was the size of the canal, the diameter of its vessels was in proportion, and bore a very small part in comparison with the medullary secretion with which the canal was filled. I made a drawing from this section, and took particular pains to render it perfectly accurate.

Having proceeded thus far, it seemed desirable to ascertain in the next place, as clearly as possible, the nature, mode of distribution, and communica-

tion of the longitudinal canals. From what I had already seen, it was evident that the characters and arrangement of these cavities were entirely dissimilar to any thing that is met with in the anatomy of soft parts; but to convey a distinct idea of their form by verbal description seemed impossible, and the making drawings from them by the compound microscope was likely to prove an undertaking both tedious and fatiguing, and in the end unsatisfactory, because the figures having been taken without the aid of a micrometer, must still be in some degree liable to inaccuracy. However, being determined to proceed, I commenced a series of drawings by the compound microscope, to shew the form, course, and communications of the canals. A longitudinal section of bone from the humerus of the human subject was calcined, the surface was prepared in the manner above-mentioned, and a drawing was made on a magnified scale from a square of one-eighth of an inch. In order to trace the further progress of the canals, the surface of the section was then carefully changed, by passing a fine file lightly over it, and subsequently brushing out the dust. A second drawing was then taken, which represented with tolerable accuracy the change that had been produced in the appearance of each canal by the operation of the file, in laying open new communications, and demonstrating various changes in the figure and disposition of these tubes. By perseverance, a considerable number of these successive figures were, in the course of a few weeks,

finished, exhibiting with some degree of accuracy the mode in which the organization of bone is regulated with regard to these canals.

But after all, the accuracy of this series of figures could not be absolutely depended upon, so that in this point of view I had yet done nothing. This experiment nevertheless afforded me the most profitable information. It proved to me clearly that the use of the compound microscope could not be continued without injury to the sight, and that consequently I must either adopt some other mode of proceeding, or give up the inquiry altogether. Revolving these circumstances in my mind, I recollected that when young, I had once for the same reason been under the necessity of laying aside the compound microscope, and had then constructed an instrument formed upon the principle of the solar microscope, and although I foresaw that the trouble of making a new one better adapted to my present purpose would be considerable, there seemed to be no alternative, and I therefore set about it. It is unnecessary to state the successive alterations this instrument underwent, by which in the course of two years its power was increased, and the clearness of the image rendered infinitely more perfect than that produced by the same instrument according to its usual construction. It now only remained to devise some mode by which the application of the file might be regulated, with perfect accuracy, so as to act equally upon all parts of the

surface of the piece of bone. For this purpose I adapted two long slips of wood to each other, so that the one might move freely over the other at a certain distance, in the same plane, without being subject to deviation. Near the further extremity of the lower piece was a sliding groove, to receive a little slip of wood, on which the specimen of bone was glued; and to the corresponding surface of the upper piece the file was fixed, so as to be capable of being moved only in a line that was exactly parallel in every respect to the surface of the bone. Having thus made every thing ready, I availed myself of the first season of fine weather to make drawings from a series of sixteen successive longitudinal sections from the human femur, one-eighth of an inch in length; but owing to a defect in the finishing they were spoiled, and consequently laid aside.

From all that had been hitherto observed, it appeared that the canals were more spacious, and the communications more free the nearer they were to the medullary cavity, but that as they approached the external part of the bone, they uniformly became smaller, although perhaps the points of communication were not less numerous externally than internally. With a view to determine how far this observation was correct, I made another series of tracings from successive sections of a portion of the humerus, only beginning from the external surface, so that the first view exhibited those fora-

mina alone by which the vessels of the periosteum communicated with those within the canals of the bone. Of this piece twelve successive sections were traced; they were, however, much less interesting than the others, because they merely afforded a demonstration that the canals are smaller as they approach the external surface, and larger towards the medullary cavity; they exhibited no communications between one canal and another, but they served on the whole to confirm the observations I had before made. Some examinations and tracings were next made from transverse sections of the humerus, and also of the femur, from the human subject, but they demonstrated little more than merely the circular figure of the openings of the canals.

From the above observations it appeared that the form and arrangement of these canals might be rendered most intelligible by making a regular series of accurate drawings from successive longitudinal sections. But from the manner in which I had found the canals traverse, it was evident that a section of a piece of bone, one-fourth of an inch long, would convey an infinitely more adequate idea of the structure than a piece that was only half the length. To admit, however, of this increase in the size of the specimen, I found it necessary to make an alteration in the instrument by lengthening the adjusting tube containing the magnifying glass, and changing the lens of two inches for one

of four and a half inches focus, and in this way was enabled to insure a perfectly distinct image of any object within the diameter of half an inch. I now prepared a piece of the humerus, and at the first favourable opportunity made a regular series of twenty longitudinal sections, which were very carefully traced in succession, the drawings being afterwards finished at my leisure *.

Upon consideration, the absolute dependance that might be placed upon the accuracy of this series of figures, rendered it desirable and practicable also, to produce upon paper the exact appearance that a cast taken from these canals would have, had it been possible to have filled them with coloured wax, and afterwards removed the surrounding parts by a process similar to corrosion. The mode I adopted was the following: I took the drawing made from the first section, and distinguished the largest canal that was found, together with all the others obviously connected with it, from the rest of the canals by a stain of red colour. I next observed the ramifications of the same canal, as they unfolded themselves upon the second drawing, and marked them in the same way, and so of all the rest. A piece of paper was then placed upon the drawing of the first section, the two pieces were held against the light, and the extreme boun-

* It was found, from an examination of these sections, that the mean diameter of the canals was about the $\frac{1}{300}$ of an inch; but they varied from the $\frac{1}{100}$ to the $\frac{1}{400}$ of an inch.

daries of the figure being first marked with a pencil to adjust the position by, the coloured canals were traced upon the vacant space. The first figure removed, the second was set exactly as the first had been, and the additional extent of the coloured canals carefully marked with the pencil; by continuing this progressive tracing through all the succeeding sections, a complete figure in outline was obtained, which by comparison with the originals was afterwards reduced to correct perspective, and then finished.

Having now stated in detail the observations I have made upon the organization and structure of healthy bone, it only remains to notice some few additional circumstances that have occurred to my notice in the course of these researches.

The very smallest as well as the largest of the canals appear to me to be furnished with a membrane lining its cavity, which membrane conveys the vessels that deposit the medullary contents of these tubes; in the same way that the fine membranous capsules within the general medullary cavity furnish the marrow contained within the bone. The examinations of the cavities of the canals in specimens of calcined bone exhibit so smooth and bright a surface, that there is every reason to believe there must be a membranous lining, although in recent specimens of full grown bone I have never been able to see it. One reason for this, however, may

be, that the circulation of the red blood is more limited in full grown than in young bone; for in the examination of fœtal bones, where the blood-vessels and canals are much larger in proportion, I have been very frequently successful in my endeavours to inject these membranes, passing from the general medullary cavity into the longitudinal canals. But, even in these instances, the colouring matter of the injection would generally pass only to a certain distance, beyond which the recent specimens exhibited the same shining, smooth, membranous surface continued forward through the whole extent of each canal, only it was colourless and transparent.

I have taken considerable pains to ascertain beyond a doubt, that the canals in bone are so much larger than the vessels they contain as to leave the circulation the same freedom that it possesses in the other structures of the body, although from the minuteness of the scale on which it is carried forward in bone, there is more difficulty in proving it here than elsewhere; but the principal inducement to perseverance was a confidence that my opinion was well founded. It was, indeed, hardly possible to suppose that blood-vessels were provided, having unyielding channels barely large enough to contain them; since vessels so circumstanced must have been incapable of increased action, and consequently bones could not become inflamed, which we know to be contrary to fact.

OBSERVATIONS

ON THE

CONDITION

OF THE

BONES IN RICKETS,

WITH

AN ACCOUNT

OF

SOME CIRCUMSTANCES NOT BEFORE NOTICED

RELATING TO THE

PROCESSES OF RESTORATION

WHICH TAKE PLACE IN THEM;

By EDWARD STANLEY, Esq.

ASSISTANT SURGEON TO SAINT BARTHOLOMEW'S HOSPITAL.

Read June 11, 1816.

HAVING had an opportunity of examining the internal structure of the bones, from a subject affected with rickets, I became desirous to understand how the soft ricketty bone, which presents an almost uniform structure throughout, being without any distinction into solid walls and medullary cavity, becomes changed into the condition in which it will be found, when upon the res-

toration of healthy actions it has acquired strength and power of resistance. And as in the latter part of this investigation, some circumstances were noticed, which as far as I can ascertain have not been before mentioned, I therefore thought their communication might not be uninteresting to this Society.

It is well known that ricketty bones, from their generally softened condition, yield in whatever direction they may be determined, either by the weight and pressure of the body or by muscular contraction; thus the bones of the upper extremity become occasionally bent from muscular action alone, and from the preponderance of power in the flexor muscles, they acquire a direction forwards. The femur has its concavity backwards in consequence of the weight of the body tending to augment the natural curvature of the bone in that direction, the flexor muscles also contributing to the same effect. The tibia and fibula frequently become curved in the same direction as the femur; occasionally however, these bones yield laterally and inwards. A curious circumstance is also to be noticed with respect to the tibia and fibula: when they become curved, they will sometimes acquire increased breadth in the direction of the curve, losing a proportionate degree of thickness in the opposite direction; hence the bones become as it were newly modelled, passing from the cylindrical into the flattened form; this would seem to be de-

signed for the purpose of enabling them to support more efficiently the weight of the body, since by this alteration, they acquire increased breadth and power of resistance in that direction, where the greatest strength is required. I have never noticed any expansion in the articular ends of ricketty bones, as is mentioned by some authors. I should therefore feel inclined to believe that there has existed only the appearance of such a phænomenon, the ends of the bones having appeared swollen in consequence of the emaciation of the surrounding soft parts.

Very few observations have been made respecting ricketty bones, during the continuance of their soft state, or state of disease, and none at all (as far as I am informed) respecting the process by which they resume their solid and healthy condition. Léveillé has given an account of the structure of a soft ricketty bone with a representation of its curved figure. It is described as having been exceedingly light, yielding with facility to the scalpel, and presenting throughout a cellular and spongy texture *. Bichat thus remarks concerning the condition of the bones in rickets. "In this disease the solid structure forming the walls of a long bone entirely disappears, the whole interior of the bone presents a homogeneous appearance, and cellular texture throughout; the periosteum is also

* Mémoires de Physiologie et de Chirurgerie pratique par Scarpa et Léveillé.

thickened *." The several bones which I have examined, exhibited nearly the same structure as that here described by Léveillé and Bichat, excepting that the periosteum was not thickened as is mentioned by the latter. The consistence of the bones was nearly that of common cartilage, they presented throughout an areolated texture, and the cells were in some parts large, and contained a brownish gelatinous substance.

Such is the state of the soft ricketty bone, that is to say, of the bone, during the continuance of the diseased action which constitutes rickets; but to this there must necessarily succeed some process of restoration, some new-modelling of its internal structure, in order to produce that distinction between the external walls and internal cavity, which it is afterwards found to acquire. From the examination of a series of ricketty bones, which have undergone different degrees of curvature, and where the process of restoration has been completed, it will be seen that in the accomplishment of this end, there invariably obtains an exact relation to the circumstances of each case, with respect to the situation, extent and direction in which the earthy matter is deposited; thus it is obvious that in the curved bone, the part where there is the greatest need of strength, to prevent its further yielding, is in the middle of its concavity, or in

* Anatomie Générale, Tom. III.

other words, in the line of its interior curve; and it is just in this situation that strength and compactness will be first imparted to the bone by the deposition of phosphate of lime. It will be further found that the greatest resistance being wanted at this part, the walls are accordingly rendered thicker here than elsewhere, and the degree to which this excess in thickness is carried, bears an exact ratio to the degree of curvature which the bone has undergone. An example drawn from a principle in mechanics may be here introduced; if a weight is placed upon the top of a hollow elastic cylinder curved to the degree of one, and the same weight is placed upon the top of another cylinder curved to the degree of three, in the latter case, the superincumbent weight will tend to increase the bending of the pillar with a greater force than in the former; if therefore it becomes necessary to apply in both cases a power of resistance, this ought to be so much greater in that instance where the disposition to bend is greater. It is obvious what will be the application of this principle to the strengthening of a curved ricketty bone, as may be readily exemplified by examining bones that have suffered different degrees of curvature; thus according to the extent in which a bone has yielded, and the weight it has to support, the thickness and solidity of the walls in the line of the interior curve will be found greater than in any other situation; it will also be noticed that the bony fibres are arranged obliquely across the axis of the

bone, in a direction evidently calculated to augment its strength and power of resistance. Lastly if such a bone as the tibia has become bent perhaps into an angle, or so as to form the greater part of a circle, and at the same time it has to support a great superincumbent weight, the deposition of the bony matter may not be confined to the thickening of the walls in the concave side, but may extend across the medullary cavity, rendering the bone here perfectly solid, and thereby greatly augmenting its strength and power of resistance.

After the discovery of these circumstances with respect to ricketty bones, I next, at the suggestion of my friend Mr. Lawrence, became desirous to ascertain whether the same principle is observed in the original construction of the body of the femur, since there here exists the same necessity for greater strength and resistance in the concave side to prevent the increase of that curvature which the bone naturally possesses, as when it becomes subsequently curved from rickets: accordingly I made sections of several bones, and uniformly found the walls thicken at that part, corresponding to the situation of the linea aspera. Whatever other purpose may be answered by this line, its existence would therefore seem calculated to augment the strength and power of resistance in the whole bone, since, according to the developement of the external projecting ridge, the walls acquire an additional thickness. The same principle may also be noticed

in the neck of the femur, where there exists uniformly a distinction between the thickness of the walls in the upper and lower side.

Of the three drawings which I have the honour to present to the Society, the first represents the internal structure of a ricketty bone in its softened and diseased state. The two others represent sections of bones differently curved, but which have now, by the restoration of healthy actions, acquired compactness of structure. In one, the deposition of bony matter is confined to the thickening of the walls on the concave side; in the other bone, a tibia which has become bent into an angle, the medullary cavity is filled by osseous matter at the part which has yielded, and the bone consequently made solid in this situation.

FURTHER OBSERVATIONS

ON

CONTRACTIONS

SUCCEEDING TO

ULCERATION OF THE SKIN.

BY HENRY EARLE, Esq.

ASSISTANT SURGEON TO ST. BARTHOLOMEW'S HOSPITAL, AND SURGEON TO THE FOUNDLING HOSPITAL.

Read June 25, 1816.

IN a former paper which I had the honour of laying before this Society in the year 1814, containing some remarks on the contractions which frequently follow extensive ulcerations and burns, I ventured to suggest a new mode of treatment to be adopted in cases where such deformities existed in the extremities. As I rested the plan which I proposed on the authority of a single case, it may not, perhaps, be deemed superfluous to offer some further testimony in support of the practice.

CASE I.

Henry Mera, aged five years, was brought to me in consequence of a contraction of the fingers

and thumb of his left hand, which rendered the extremity nearly useless. He had been burnt when about two years old in the palm of the hand, fingers and wrist; and no attention had been paid to keep the fingers extended during the process of cicatrization. From this neglect the present deformity arose, as there can be no doubt that the same attention which has been since applied to remedy the evil, might have been equally efficacious in preventing it.

The contraction had existed for above two years and a half when I first examined it, and the cicatrices were remarkably firm and tense. The rough sketch which will accompany this, will afford a better idea of the extent of the deformity, than can be conveyed by mere words. It will be there seen that the little finger was not affected, and this could be brought to oppose the extremity of the thumb, which was the only useful motion the hand was capable of, the other fingers and thumb being so much bound down that they could not be approximated. In such a state I conceived it adviseable to attempt any operation, which afforded reasonable prospect of benefit; though, from the long continuation of the contraction, and the alteration which had taken place in the last joints of the fingers, I could not expect to meet with complete success.

Having represented to the father the possibi-

lity of failing, it was determined to make the attempt.

The operation was performed on the 23rd of November, 1815, in the following manner. An incision was made on the outer side of the cicatrix of the fore-finger, beginning nearly at the extremity of the nail, which was drawn over the end of the finger, having more the appearance of a talon than a nail. The incision was carried in the direction of the three phalanges of the bones of the fingers, describing an inner line, parallel to that formed by the posterior surface of the finger, and terminating at the base of the cicatrix, which was situated nearly opposite to the junction of the metacarpal bone with the finger, encroaching a little upon the palm of the hand. A similar incision was made on the inside, and the two met towards the palm of the hand. The whole of the cicatrix was then dissected off, carefully avoiding any injury to the theca of the tendon. The finger now admitted of greater freedom of motion, but could not be quite extended, in consequence of the tense state of the integuments at the sides of the finger, which had been drawn together by the cicatrix, and also from the resistance afforded by the flexor muscles, which had been so long confined to a limited sphere of action. By making an incision through the integuments on each side of the second and third joints, a greater extent of motion

was admitted, and the finger could be almost straightened.

The same operation was next performed on the middle and ring fingers. The wounds were dressed with adhesive plaster and lint, and each finger was gently bound down on a splint, which was digitated at its extremity for the purpose. I was not anxious to extend the fingers completely at this first dressing, for fear of causing too much irritation and spasm in the flexor muscles, from stretching the tendons. It was determined not to attempt any thing with the thumb until some future time, when the success of the operation on the fingers had been ascertained.

He passed rather a restless night after the operation, and the following day complained of some pain and heat in his hand; the bandage was removed and another applied, and the whole arm was kept damp with tepid water. He soon became easy and remained tranquil during the day.

Nothing particular occurred for the space of a week from the operation, when he became very irritable and feverish, and complained of pain in his hand and head, and at night he was delirious. The next morning he sneezed and coughed several times, and his eyes were tumid and began to weep, which led me to suspect that he was affected

with rubeola, which prevailed much at that time in London. The following day the coryza was much increased, and in the evening an eruption made its appearance, which removed all further doubt.

During the progress of the measles the wounds on the fingers inflamed and sloughed in two or three places, and the whole arm and hand swelled and was thickly covered with eruption. The cuticle from the hand afterwards came away in large patches. A bread and water poultice soon quieted all this disturbance, and in a few days I was able to resume the extension on the splint. Every thing now went on favourably, the wounds slowly healed and were perfectly cicatrized by the middle of December. Great care was taken during the whole of this period, and for a long time after to retain the fingers bound down on the splint, as the tendency to contract again was very powerful. By perseverance, however, this was prevented from taking place in a longitudinal direction.

About the beginning of January, I determined to operate on the thumb, and endeavour to restore it to its natural form. It will be seen by the drawing, that the bridle reached from the ulnar side of the wrist to the root of the nail, and held the thumb firmly extended across the palm of the hand, with its extremity towards the base of the little

finger. The nail was much altered in form, and was drawn down at its outer inferior angle.

With a view to relieve this deformity, I commenced my incision near the root of the nail, and extended it to the first joint of the thumb, and then turned it towards the ulnar side of the carpus. In a word, I removed the whole firm cicatrix very freely. When this was accomplished, the thumb could be brought in contact with any of the fingers, and moved in every direction. After dressing the wound I bound the hand down on a flat digitated splint, the thumb forming an angle of about 45° with the fore-finger. It is now about two months since the wound cicatrized, and I yet take the precaution of directing it to be bound on the splint at night. During the day he is at liberty, and I am happy to add he enjoys the perfect use of it. The only deformity which remains is in the last joints of the fingers, which are slightly bent, and the nails have still a tendency to turn over their extremities; but I trust that he will in time outgrow this.

CASE II.

James Hide, in December 1814, when about four years old, set fire to his clothes, and was severely burnt in his body and extremities. His

right arm had suffered most, large deep sloughs reaching from the axilla to the hand and fingers. The treatment recommended by Mr. Kentish was resorted to by a medical gentleman in the neighbourhood, but unfortunately no attempt was made to keep the limb in an extended position.

I saw the boy about four months after the accident, at which time most of the wounds were granulating, and in part healed. All the other places were of minor importance to the right arm, and were not situated near any joints where contractions are most to be dreaded. My attention was therefore principally directed to prevent any extension of the mischief which existed; for the elbow had been kept bent, and the wrist was twisted on the fore-arm, and considerable contraction had already taken place at the elbow, wrist and thumb. The fore-finger was greatly distorted; the first phalanx being forcibly drawn towards the back of the hand, whilst the second phalanx was bent towards the palm. An irritable ulcer covered the back of the finger, and apparently communicated with the second joint. As this finger appeared to be rendered useless, I proposed at that time to remove it, by which the treatment of the other places would have been much facilitated. This however was strongly objected to by the father, who was a farrier, and not a little opinionative; though to do him justice, he paid very great attention to the

other directions which I gave him; and proved a very useful assistant in dressing the wounds.

By gradual means the limb was extended on a long splint, and all further contraction at the elbow and wrist prevented. After some time all the ulcers skinned over, but his hand remained quite useless in consequence of the retraction of the thumb, and the deformity of the fore-finger. Still however the father thought that he could supple the joints with some of his oils and nostrums, which he continued to use until February, 1816, when he called to solicit me to attempt some operation for the relief of his son's hand.

At this time the first phalanx of the fore-finger was so forcibly drawn back by the thick firm cicatrix, that the head of the bone projected considerably forwards, carrying with it the metacarpal bone and effectually preventing the other fingers from approximating to the thumb, which remained retorted towards the radius *. The middle finger was likewise impeded in its motions by the cicatrix on the dorsum of the hand. The elbow was bent to an obtuse angle of about 140°, and the wrist on the fore-arm by the same long bridle, which extended from the upper arm to the wrist, where it divided,

* The outline which accompanies this, will perhaps explain the deformity better than mere words.

and one portion went to the back of the thumb, causing the retraction above-mentioned. It was curious to observe the effect which this had upon the nail, which was divided through its whole extent, like the horse's hoof when affected with sand cracks. Any attempt to straighten the wrist increased the angle at the elbow where the cicatrix was very tense, and almost constantly ulcerated on its surface.

Although I did not expect to be able to restore the use of the hand by any operation short of amputation of the fore-finger, I was willing to attempt removing the cicatrix at the back of the hand, which would be a preliminary step towards amputation, should it be found impracticable to release the contraction. Accordingly I made an incision on each side of the firm condensed mass, which was nearly an inch in depth, and dissected it from off the extensor tendon, by which the first joint was completely liberated; but I now found that the second joint could not by any effort be extended, in consequence, as was subsequently discovered, of ossific matter having been deposited on the upper part of the joint, which did not wholly prevent some degree of flexion.

Nothing now remained to be done, but to remove the whole finger; and as the middle finger was rather confined in its motion and the thumb

greatly retorted, I conceived it better to remove a considerable portion of the metacarpal bone, sawing it off in an oblique direction, by which I much facilitated the approximation of the thumb and fingers. The integuments on the palmar side of the finger being quite healthy, I dissected them down from the second joint to the point, where I removed the metacarpal bone; by this precaution I was enabled to cover with a flap of sound skin the large space, which had been left by the removal of the cicatrix.

My next object was to release the thumb and wrist, which I effected by removing about four inches of the bridle, situated at the root of the thumb and extending up the arm. This immediately gave considerable freedom of motion to the thumb, wrist and elbow, which advantage was improved during the subsequent treatment. The greater part of the wound in the hand healed by the first intention, forming a very neat stump, and the other wound was quite closed in three weeks; the cicatrix occupying a very small space compared with the former bridle, in consequence of the sound integuments having been drawn together by adhesive plaster. The elbow and wrist are now nearly straight, the thumb and fingers can be brought in contact, and he possesses a very useful hand.

I have entered rather into the detail of this case,

considering it of great practical utility, shewing how much may be effected in the prevention of contractions by proper attention, and by regulating the direction of the contractile process, which takes place after the healing of large wounds, as from the extent of the injury, and the contraction which *had* taken place, there is every reason to suppose that the limb would have been rendered useless, but for the pains which were bestowed to maintain it in an extended position.

I have also considered the case as worthy of being recorded, as affording additional evidence of the efficacy of excision, and of the practice I have recommended to be adopted in contractions. In my former paper on this subject, I censured the plan of allowing limbs to be retained in a bent position, with a view to expedite the cure by approximating the sides of the wounds; subsequent experience has convinced me not only of the injury which will infallibly accrue from such practice, but that the temporary advantage supposed to be gained is entirely fallacious; for every sudden attempt to extend a limb which has been thus treated, will crack the cicatrix, and cause it to ulcerate on its surface, even for many months after the first healing of the wound. This was the case in the first instance in which I operated at the Foundling, and in the case just related; nor was this disposition to

ulceration relieved until all tension had been removed by the operation.

If therefore any argument were requisite, in addition to that of preventing deformity and lameness, to induce practitioners to bestow great attention to position, during and long subsequent to cicatrization, in all instances where the wounds are in the neighbourhood of joints, I am fully convinced that they will thereby gain much time in effecting a perfect and permanent cure.

My friend Mr. Brodie has favoured me with the following valuable communication, and has obligingly permitted me to submit it to the Society.

CASE III.

" Richard Wheatley, nine years of age, was admitted into Saint George's Hospital on the 15th of May, 1815. He had a bridle or fold of skin on the anterior part of the neck, from the healing of the sore formed by an extensive burn. The bridle was in a longitudinal direction, drawing down the lower lip, cheeks, and angles of the mouth, keeping the chin much depressed, preventing the jaws being closed, and occasioning considerable deformity. May 19th, the cicatrix, which was transverse

and broad, with the condensed cellular membrane under it, was removed by an operation. Adhesive plaster was applied, so as to draw the edges of the wound together from side to side, and a broad collar of pasteboard was applied round the neck over the dressings. The sore was dressed in the manner already described, with a view of making the cicatrix longitudinal, instead of transverse as before. On the 7th of October, the sore was healed. At this time there was still a bridle in the forepart of the neck, but it was very trifling. The chin was not depressed; he was able to close the jaws, and scarcely any deformity remained."

I feel happy in being able to add this case, which is doubly interesting, as it is the first in which the cicatrix was removed for a contraction of the integuments of the neck; a situation very liable to extensive burns, which in many instances are followed by frightful contractions. In all such cases I should recommend the earliest possible adoption of the operation, as by delay the subjacent structure will participate in the affection, and render every attempt abortive.

Mr. Ring has favoured me with the following particulars of a case, in which he operated with success.

"—— Cole, a girl aged five years, was brought to me in October, 1814, who had met with a severe scald about three years before, which occupied the face, neck, a great part of the body, and the whole internal surface of the right arm. As her life was despaired of, no attention was paid to her arm, which was permitted to heal in a bent position: adhesion consequently took place between the burnt surfaces, and a strong cutaneous web was formed, uniting the arm and fore-arm. The greatest length of this web did not exceed two inches and a half; and extended from the upper part of the biceps to the wrist. From these points to the bend of the elbow, the cutaneous fold became shorter and considerably increased in thickness. In consultation with my uncle and my friend Mr. Bertin, it was considered that the injury was confined to the skin, and that by a total removal of the diseased mass, the use of the limb might possibly be restored. The state of her health being then unfavourable, the operation was deferred. During this delay, the fifth volume of the Medico-Chirurgical Transactions was published, containing a paper by Mr. Earle, with a case, and some valuable practical remarks on this subject, which fully confirmed us in the propriety of the operation. The edges of the cicatrix were my guide, and I removed the whole web from off the arm and fore-arm. On dividing the skin I found many strong cellular bands extending from the muscles of the fore-arm to the biceps, which were obliged to be

dissected off. As they were removed, the arm was gradually brought into an extended position, but some force was required to keep it there, as the extensor muscles were almost useless. The wound was simply dressed, and the arm kept extended. As she was in bad health, it cicatrized slowly. She was brought to my house daily until the wound was reduced to the size of a crown piece, when her father, who was generally intoxicated, behaved very insolently, and I was compelled to turn him out, since which time I have never seen my patient."

Although this case was not followed up to its termination, it is perfectly satisfactory; as the operation was quite successful, and there can be no doubt but that perseverance in maintaining the extended position would have prevented any recurrence of contraction.

Some time ago I assisted my friend Mr. Hodgson, in an operation on a boy's hand, for a contraction of the thumb and wrist, which was attended with complete success.

These instances which have been recorded, sufficiently establish the efficacy of the treatment proposed, and are a proof of the importance of giving early publicity to any new facts which may tend

to the improvement of so progressive an art as surgery. I hesitated in bringing forward my former paper while it rested on the evidence of a single case, but I am now satisfied that it is better to hazard the imputation of being premature, than to suppress information which may be conducive to the benefit of society.

May 13, 1816.

CASE

OF

HERNIA OF THE DURA MATER

CONNECTED WITH

HYDROCEPHALUS INTERNUS.

By HENRY EARLE, Esq.

ASSISTANT SURGEON TO ST. BARTHOLOMEW'S HOSPITAL, AND SURGEON TO THE FOUNDLING HOSPITAL.

Read June 25, 1816.

ON the 11th of February, 1812, I was requested to see the infant daughter of Mr. W. on account of a large transparent globular tumor, at the back of the head, which had existed from birth. She had been born eight days, during which time it gradually increased; and was at this period about the size of a small billiard ball. It was situated a little above, and to the right of the superior transverse ridge of the occipital bone, immediately opposite to the posterior lobe of the right hemisphere of the brain. On examining it attentively, it appeared to be in its nature similar to the disease termed spina bifida, and to consist of an expansion of dura mater containing serum, in consequence of a deficiency of bony matter, or other support at this part. The

head was not unusually large, nor in any other respect malformed. The pupils were sensible to the impression of light, there was no strabismus, no loss of power in the limbs, nor any one symptom of pressure on the brain, with the exception of a constipated state of bowels, requiring the daily exhibition of purgative medicine. In consultation with Mr. Astley Cooper, Mr. Croft, and Mr. Woods, it was determined to adopt the radical cure as proposed by the former gentleman in cases of spina bifida; in a paper published in the second volume of these Transactions. The tumor was accordingly punctured with a common needle, on which a small quantity of limpid serum oozed out; it came away so slowly that two more small punctures were made, and about ʒiij were let out. A common fillet was then passed round the head to make a slight degree of pressure. On the 13th, I visited the child again; the punctures made by the needle had not healed, and there had been a constant oozing of serum. The tumor had quickly regained its former size after the operation, and was very tense; on gently compressing it about ʒiij came away, and the sac appeared about half empty. The openings were covered with lint, and a graduated compress placed on the tumor, and confined with a fillet as before. On the 15th, the sac was again full, and the openings made with the needle were healed. I now punctured it with a very fine trochar-made needle, pointed for the purpose. About an ounce of serum was drawn off

through the canula, and the sac evacuated. When in this loose collapsed state, a considerable opening of a lozenge shape was distinctly felt in the occiput. A compress of lint was applied opposite to this vacancy, and confined by means of a bandage made on the same principle as the hair-lip bandage, very narrow ribbon being substituted for thread. Notwithstanding the steady and equal pressure which was thus kept up, the sac rapidly filled again, and, on the 17th, was to all appearance the same as when I first saw it.

The same operation was resorted to on the 19th, 21st, and 23rd, with exactly the same result. The child did not appear to suffer at all from the frequent repetition of the punctures, nor from the subsequent pressure. On the 23rd the fluid was not so transparent, and had a yellowish tint; the sac was now evidently thickened and less diaphanous.

On the 25th, it was again punctured and completely emptied, when the increased density and opacity of the sac was more evident, and a ridge of lymph was felt round the opening in the occiput. On the 28th, very little fluid had collected, since it was last punctured; the sac was nearly collapsed and much thickened, the curative process appeared to be going on very favourably. Since this change had taken place, the bowels acted without the oleum ricini, which had been administered daily

until the 25th. A steady and regular pressure was constantly persevered in, and there was no fresh accumulation from this time until the 14th of March. During all this period the child continued to grow, and improved much in strength and appearance.

The sac was now rather inflamed, the cuticle came away in large patches, and the whole surface discharged a thin ichor, which irritated the surrounding integuments. It was necessary, in consequence of this, to relax the bandage, and a lotion consisting of equal parts of liquor ammoniæ acetatis and water, was directed to be applied constantly. This had the desired effect of abating the inflammation, but a fresh accumulation took place, and, on the 17th, the sac was nearly of its original size, but quite opake and very vascular.

It was now punctured with a common bleeding lancet introduced obliquely, and the whole of its contents evacuated, which did not amount to ℥iv; evidently proving how much the parietes were thickened, as the sac was incapable of containing one half its former quantity. The opening made with the lancet bled freely, and healed by the first intention; when the inflammation had entirely subsided, pressure was again made as before. Nothing particular occurred from this time until the 3rd of April, when the sac again began to fill without any apparent cause. On the 5th, it was

so much distended, that I thought it right to puncture it with a lancet, after which the opening healed as before.

Notwithstanding considerable pressure was made, fluid continued to collect very gradually until the 15th, when it was again necessary to evacuate it.

The child had been for some days very unwell, and voided much green offensive matter from its bowels. She was very irritable and querulous when moved. On the 17th, an eruption appeared over her body, and the surface of the tumor became inflamed; pressure was omitted, and a bread and water poultice substituted. On the 18th, she continued much disordered in her bowels; some oleum ricini with two drops of tinctura opii were given, which quieted her a little. The flap of the last orifice now began to ulcerate, and the whole tumor was much inflamed. On the 20th, the ulceration had extended itself, and communicated by a small opening with the cavity of the sac, through which there was a continual oozing of serum. She continued much deranged in her bowels, until the 23rd, when she was so much exhausted as to refuse the breast; at ten the same night, she expired without being at all convulsed, or exhibiting any one decided symptom of inflammation or effusion on the brain.

Appearances on dissection of the brain.

On turning down the scalp from the occiput, as low as the tumor, a slight effusion of bloody serum was apparent to some extent round the opening in the bone. When the cranium and dura mater were removed, the arachnoid membrane appeared rather opake, and was raised by the subjacent fluid, which was contained in the cellular texture of the pia mater. Immediately round the opening in the occiput, a small quantity of puriform matter was deposited; the membranes and substance of the brain were particularly void of red vessels. The medullary structure was so remarkably soft, although the body was examined only a few hours after death, that it was wholly impossible to make an accurate dissection of its different parts. The lateral ventricles were enlarged, and contained about four ounces of fluid. On inflating the sac with a blowpipe, no impression was made on the water in the ventricles, but a probe passed readily into the iter a tertio ad quartum ventriculum. The air not passing, may be attributed to the soft state of the brain, which collapsed on removing the dura mater. The pia mater appeared to terminate at the opening in the occiput, into which a very small portion of medullary matter had insinuated itself.

On cutting into the sac, it appeared to be lined

with layers of coagulable lymph, and with shreds of lymph hanging irregularly into its cavity, which was nearly obliterated. The opening which communicated with the ventricles was just large enough to admit a probe, round which organized lymph was thickly deposited, and would probably in a short time have completely closed the aperture. Permission was not obtained to examine the body further.

From a careful review of the circumstances of this case, there can be no doubt that the hydrocephalus internus existed from birth. I rest this opinion on the quantity of fluid which was drawn off during the earlier stages of the treatment, exceeding what the sac alone could contain; on the great rapidity with which it was replenished, sometimes in the space of a few hours after it had been emptied; and on the connexion ascertained after death, to exist between the sac and the ventricles.

Although this case terminated unfavourably, it proves that a radical cure may be attempted with impunity in similar cases, and affords a good illustration of the process by which a cure is to be effected. I consider it interesting, as it shews that the water contained in the ventricles may be partially drawn off, without causing syncope or any apparent disorder in the function of the brain; this probably depended on the yielding state of the parietes of the head, which readily accommodated

itself to the diminished bulk of its contents; and on the great caution which was observed not to admit any air at the punctures. In a similar case, which a medical man mistook for an encysted tumor, and which he suddenly removed, death instantly ensued.

As an insulated and unsuccessful case, this does not perhaps merit much attention; but as a sequel to the important facts recorded by Mr. Cooper, it may not be unworthy of notice. The punctures with the lancet were not resorted to until the sac was too thick for the introduction of the stilet and canula; no serious consequences followed the two first punctures, and the last healed, but the flap afterwards ulcerated, from being attacked with erysipelatous inflammation. I have delayed giving publicity to this case, in the expectation of being able to repeat the experiment; but as instances of this form of disease are of rare occurrence, no opportunity has since offered itself in which I could attempt it. I am now induced to submit it to the Society, as the first recorded instance in which an operation has been attempted, even with partial success, and entertain sanguine hopes that it may be repeated with more favourable results.

Since the occurrence of this case, I have met with one similar affection in a girl aged 12 years, in Saint James's workhouse, of whom I learnt the following particulars. She was born with a diaphanous

tumor at the back of the head, nearly in the same situation as in the case above-mentioned. The head itself was very large and evidently hydrocephalic. The cranium and tumor gradually increased in size, until the child was about six years old, when the head began to close at its sutures. At the time of my visiting her, the dimensions of the head were 22 inches in circumference; across the vertex from ear to ear 14 inches and a half; from the superciliary ridge of the os frontis to the commencement of the tumor 15 inches. The circumference of the tumor in one direction was 13 inches, in the other 14, at its base about six. The os frontis did not project so much as is usual in these cases. The eyes were both turned towards the nose, and the pupils were much dilated. The right side of the face was drawn a little awry, which symptom was always increased when she had pain in her head, to which she was very subject. She possessed the use of her upper extremities, and could move her lower, but could not stand. Her health was generally good, and her bowels acted regularly; her intellect was by no means deficient, though she was incapable of speaking, no pains having been taken with her education, nor any attempts made to teach her to write or articulate. She heard distinctly, and understood what was said to her, and possessed a retentive memory of persons and facts, and was capable of combining them. She had two sisters then living, who were both born hydrocephalic.

Mr. Charles Clarke possesses a preparation of this disease which he obligingly shewed to me. It was taken from a still-born child; at the back of the head a little above the occipital foramen, there is a large pouch of the size of a full-grown fœtal head, consisting of an expansion of dura mater, covered with common integuments. Some time ago, I met with a case in Hildanus, which from the accompanying drawing and the history of the case, must, I conceive, have been of this nature. The tumor existed from birth, and increased to a great size; the child gradually wasted away, as we frequently find to take place in hydrocephalus. Johannes Sereta, who transmits the account to Hildanus, calls this "carnosam molem," and attributes the child's wasting to all the nourishment going to supply this mass. A further account of this case may be found in Observ. Chirurg. Fabric. Hildani, centuria sexta, observatio 17.

June 5, 1816.

DESCRIPTION

OF AN

EXTRA-UTERINE FŒTUS

CONTAINED IN THE

FALLOPIAN TUBE;

BY GEORGE LANGSTAFF, Esq.

SURGEON.

Read June 25, 1816.

ON the second of August, 1815, I was requested by Mr. Sowler, apothecary, Tabernacle Square, to inspect the body of a woman who expired rather suddenly, without having experienced, for a number of years previous to her death, the least disordered state of health.

He informed me, that she was seized (about two o'clock in the morning) with a violent pain in the lower part of the abdomen, accompanied with sickness of the stomach, and a disposition to faint. Some warm brandy and water was taken, which seemed to afford slight mitigation of the symptoms; but at five o'clock they became worse, and about seven Mr. Sowler was called to visit her. Her

pulse at this time, was very rapid, small and intermitting, her countenance ghastly; a cold clammy perspiration pervaded the body, the intellectual functions declined, she sunk rapidly, and died at nine o'clock; seven hours from the commencement of the attack.

Dissection.

I inspected the body eight hours after death, in the presence of Mr. Sowler, and Mr. Camplin, assistant to Mr. Jones of Finsbury Square. There were all the appearances of her having been a handsome well proportioned woman, but rather corpulent. On opening the parietes of the abdomen, we were greatly surprised at the presentation of arterial looking blood, chiefly in a fluid state, covering the intestines, and occupying the pelvic region.

The quantity of blood measured upwards of two quarts. From this appearance it was inferred, that some important artery had given way, or that a large aneurism had burst*. After sponging and cleaning the blood from the viscera, they were carefully examined, and found remarkably natural

* This supposition arose from my having opened the bodies of persons who died suddenly from the bursting of large aneurisms, without any of the symptoms of that disease being noticed during life; which dissections I purpose on some future occasion to relate to this learned Society.

in structure, but pale from having been deprived of so much blood. The abdominal aorta and its principal branches, together with their corresponding veins, were attentively dissected, and to our astonishment found to be perfectly healthy.

From whence the hæmorrhagy proceeded became mysterious, but a probable speculation or conjecture could not be offered, until the removal of the pelvic contents: when it was found that the right fallopian tube was dilated to about the magnitude of a moderate-sized hen's egg, and had burst in two places.

I brought the uterus home, that I might deliberately search for the cause of the increased fallopian tube, and notice such other appearances as might present themselves.

The figure of the tumor, the appearance of coagulated blood beneath its serous membrane, and its having been lacerated, made it look very like a ruptured aneurism.

The spermatic artery on this side, and those arteries ramifying between the laminæ of the peritoneum, which form the ligamentum latum, and supplying the fallopian tube, being greatly enlarged, induced me to place pipes in them, and inject some size and vermilion, previous to opening the tumor. The injection was observed to flow in a full stream

from the lacerated openings in the fallopian tube, when it was thrown into those vessels; and there was also a moderate stream when the spermatic artery was injected, which proved that the giving way of those arteries was the immediate cause of the person's death, and that the spermatic arteries, besides supplying the ovaria, anastomose freely with the uterine vessels, originating from the internal iliacs.

The distention of the tube had commenced about two inches from the fimbriated extremity; this part of the canal being rather more capacious than that of the left side; but the internal surface retained its plicated arrangement, whilst the remaining part of the tube from the enlarged portion to the angle of the uterus was completely obliterated.

The lacerations were in the posterior surface of the tubal enlargement, and in the longitudinal direction; each measuring about a quarter of an inch. The fallopian contents were next minutely examined; and after carefully washing away the coagulated blood from beneath the peritoneal covering, I discovered a chorion and amnios, with a fœtus of about eight weeks, floating in the liquor amnii.

In consequence of the dilatation of the fallopian tube by the increasing size of the ovum, its dif-

ferent tissues (except the external containing one, which was rendered extremely thin) had been nearly destroyed.

The right ovarium was made very red with the injection, more especially about the corpus luteum, which was remarkably large, and contained a gelatinous looking mass.

There were several corpora lutea in the left ovarium, one of which shewed the vesicle having been removed from thence in the conception previous to the last.

Lastly, the uterus was examined; it was considerably larger than we generally observe that organ to be in the unimpregnated state, even in women who have borne several children. On laying it open, the uterine vessels were observed to be very large, but empty; and there was a great quantity of gelatinous matter in the cavity and neck of the uterus. When this was washed off, the internal surface of the viscus looked very vascular, having been highly injected; but there was not the least appearance of a decidua.

The cervix uteri was not closed by the mucous secretion from the glands situated there, as it is during utero-gestation, when it proceeds in the ordinary manner; as I easily introduced my finger

through it into the uterus, although the lacunæ were numerous and loaded with mucus.

The viscera of the thorax did not exhibit the least diseased appearance; and although I am, and have been for several years, in the frequent habit of noticing the effects produced by morbific actions, I do not recollect ever having seen a body so completely free from organic disease, at the same period of life.

Some time after the examination, I collected the following information; viz. That she was forty years of age; had borne five children; and was delivered of a full grown living child, seven months previous to the last stated conception. The menstrual period answering the regular time, happened a week before her dissolution; and sexual intercourse was performed the night of her death.

Observations.

It has been remarked, that of all the species of extra-uterine pregnancy, the fallopian is the most frequent; but as peculiar appearances are observable in all, and even in the same species, I shall briefly notice some of those which occurred in the present case; and first, the remarkable changes produced in the uterus.

This organ, whether the impregnation be of the tubal, ovarial, or ventral kind, has been found in a certain degree (from sympathy) enlarged, its vessels dilated, the vascularity of the mucous or internal surface increased, in many instances a decidua uteri formed, and the lacunæ of the mucous glands loaded with mucus, or the cervix closed as in ordinary gestation.

Dr. Denman in his Introduction to the Practice of Midwifery says, that "though the fœtus be extra-uterine, the uterus becomes considerably enlarged, and performs its proper office by providing the efflorescent or deciduous membrane for the reception of the ovum." And Dr. Burns in his Principles of Midwifery states, "it is curious to observe, that generally the uterus enlarges somewhat, and, in most instances, I imagine decidua is formed." In the same work, note 15, it is stated, Boehmer long ago observed this; and Dr. Baillie, in the 79th volume of the Philosophical Transactions, mentions, that Dr. Hunter had a preparation of tubal pregnancy, in which the uterus was found enlarged to double its natural size, and contained a decidua. Dr. Clarke found the uterus, in the second month of extra-uterine pregnancy, exactly the same size as if the embryo had been lodged within it. The decidua was formed, and the cervix filled with gelatinous matter*.

* Transactions of a Soci[illegible]y, &c. vol. 1st, page 216.

A case similar to Dr. Clarke's is related by Mr. T. Blizard, in the Edinburgh Philosophical Transactions, vol. Vth, page 189. It is there stated, that "changes had been produced in the uterus, similar to what are seen in ordinary gestation; its parietes were thickened; its cavity enlarged; its cervix shut up with a jelly; and the glutinous effusion just described might not perhaps improperly be considered as a membrana decidua in its early state of formation."

In the case I have the honor of relating, the uterus certainly had not increased in the same ratio as in the instances above quoted, as will be demonstrable by the preparation accompanying the painting. It likewise differs from most of the cases of the kind on record, from having the cervix uteri widely open, and a decidua not having been formed. But perhaps the gelatinous matter found in the uterus, may by some gentlemen be considered as the incipient step towards the formation of that membrane.

If it be admitted that this membrane is an adventitious production of the internal surface of the uterus; that in the mode of production it resembles the laminæ of coagulating lymph, formed by inflamed surfaces; and that it is produced previous to the reception of the ovum into the uterus, I think I shall not be considered incorrect in having

stated, in the history of the dissection, that a decidua was not present.

In the cases of ruptured fallopian tube from extra-uterine conception, which have been related, mention is only made of the laceration, without noticing the morbid changes produced in that part, and the probable cause of its sudden rupture.

Dr. Clarke merely says, " But the most remarkable thing in this case is, the laceration of the fallopian tube, and the fatal hæmorrhage thereby occasioned." Dr. Burns thinks the tube slowly inflames, and sloughing takes place. Having only seen this solitary case, I shall not presume to say what takes place generally in those instances; but shall venture to describe what appears to me, from the result of the dissection, the most probable cause of laceration.

In consequence of the regular developement of the ovum, the containing parts are distended beyond their capability, and become attenuated; progressive absorption takes place; the vessels supplying the ovum, which are necessarily enlarged, suffer in the destructive action; and from their not having been obliterated by adhesive inflammation, their coats are gradually absorbed, they burst, and the blood now finding free access to the sac, which is already rendered extremely thin, it bursts as in

aneurism, the blood is propelled into the cavity of the abdomen, and thus life is extinguished.

One of the most remarkable, and I believe unique circumstances in this case is, that no communication existed between the uterus and the ovum, the canal of the tube being completely obliterated; and it is also worthy of remark, that there was only the corpus luteum in the right ovarium, which has been described; all the ova except this, having appeared to be produced by the opposite ovary.

It would be impossible to state accurately, whether this obstruction took place, before the fallopian impregnation, or in consequence of it; but in a physiological point of view it would be very desirable to ascertain this point, as it would satisfactorily account for the detention of the ovum, and refute the opinion entertained by some physiologists, that the semen must be in actual contact with the ovum for the production of the species.

From the complete state of obliteration of the tube, I must confess I feel inclined to suppose, that it was not effected by adhesion in consequence of inflammation from the last conception; or else, from the same cause, why was not the extremity of the tube obliterated?

I shall conclude my remarks by quoting the following passage from Dr. Clarke's case; and I hope the whole will be considered worthy a place in the transactions of this Society.

"Upon the whole, the symptoms which accompanied this disease, were such as could not have led any one to form a conjecture respecting the nature of it, and even if it had been known, we could only have deplored the insufficiency of our art to remedy a situation so uncommon and so fatal."

OBSERVATIONS

ON

TETANUS.

BY DAVID I. H. DICKSON, M.D. F.L.S.

PHYSICIAN TO HIS MAJESTY'S FLEET, AND RESIDENT PHYSICIAN AT CLIFTON.

Read June 25, 1816.

MY attention having been directed to the subject of tetanus, by meeting with some very severe instances of this disease, during the expedition against New Orleans, I was induced to put such remarks as occurred to me on paper, with the intention of afterwards enlarging, and offering them in illustration of the cases I might receive. Disappointed in the latter expectation, I feel scarcely satisfied that my observations are worthy of repetition; and the only apology I have to make in presenting them to the Society, is the hope that they may, in some instance, excite greater attention to those symptoms by which the disease generally gives warning of its approach; but particularly to the prevention of that torpid state of the bowels, which so undeviatingly precedes the attack.

This disease is with propriety divided into the acute and mild, or what I think has inappositely been termed the chronic species; and the latter into the symptomatic and idiopathic varieties. A witness of the first, or acute symptomatic form, from wounds in the cases in question, could not fail to be impressed with the wide difference between these two species in a practical point of view; nor with the conviction that those curative measures which have been described as successful in the one, are almost certainly doomed in the other, to be followed by unqualified disappointment. The examples that came within my knowledge (but of course there may have been others with which I am unacquainted) were six or seven soldiers under the care of navy surgeons; and they occurred within a few days after the attack of the 8th of January, 1815, and consequently in an inflamed and painful state of the wounds; but when the great number that suffered on that occasion, the distance which they were afterwards conveyed, (chiefly in open boats,) and their consequent exposure to the cold night air, and to the heavy rain which fell on the afternoon of the 10th, are taken into consideration, it will rather be a matter of surprise that so few instances followed, than that those which did occur proved so severe and so rapidly fatal. In these cases as in others, the danger was in proportion to the rapidity and violence of the attack; and they terminated fatally, as far as I am informed within the second, third, or fourth day; indeed

this form I believe generally runs its course within the third day.

The only case, however, of which, from having come more immediately under my notice, and from having been favoured with some observations by Mr. Boyd, the surgeon of the hospital ship, I am enabled to detail the particulars, was that of an African, who had lost a great part of his foot by sloughing, from having been frost-bitten; and in whom the symptoms supervened immediately upon a very inactive and torpid state of the parts being succeeded by a high degree of sensibility. Some spasmodic twitches had preceded the attack, but a tenseness about the præcordia, and a difficulty of respiration, were the symptoms first complained of at the morning visit. These very soon increased to a very painful sense of traction towards the spine just under the ensiform cartilage, with spasms and rigidity of the clavical, temporal and masseter muscles, which in a short time terminated in trismus. The jaw seemed occasionally to relax a little during the day, but the spasmodic contractions extending to the abdominal and other muscles, returned with more frequency and violence from time to time; and the difficulty of deglutition, and all the symptoms, increased rapidly until the next morning, when he died.

During their distressing progress he took above ℥iij of tincture of opium, beginning with 100 drops,

and augmenting the dose every two hours, and 14 ounces of rum made into strong punch, with the view of inducing stupor and a degree of intoxication; but it was found impossible to get him to take a sufficient quantity to produce this effect, for as the disorder increased, the difficulty of swallowing became so great that the attempt brought on such violent spasms of the neck and throat, as to threaten suffocation; rendering perseverance in the remedies to the wished for extent altogether impracticable.

Mr. Boyd makes the quantity of opium exhibited rather greater, but as the above corresponds with the account kept by the first assistant, who sedulously attended the unfortunate man, I am inclined to think it is correct.

This poor fellow had been embarked with his regiment by some mistake; for he had formerly lost a leg, although I do not recollect from what cause; of this I was not aware at first from seeing him in bed. On questioning him about the state of the other foot, he assured me with a smile that he never had any pain in that now; and upon my insisting on examining it, he was highly amused by the surprise which my countenance no doubt expressed, on seeing a wooden leg protruded from beneath the blanket. As this proved to be the only tetanic affection in the Gorgon, though besides several cases badly wounded, there were some other

Africans also frost-bitten, particularly one man who had lost the greater part of both hands from this cause, it seemed to favour the idea I was inclined to entertain, from having observed a greater susceptibility of impressions in those who have been previously wounded, that the infliction of a wound or an operation leaves behind an increased irritability of temperament, rendering the sufferer more obnoxious to this disease, upon exposure to any subsequent injury.

The pulse here corresponded with what is generally observed in tetanus. It is seldom much affected in the early stage; but its changes afterwards will of course depend upon the state of the wound, and of the system. Mr. Boyd, both in the symptomatic and idiopathic cases which he has seen, describes the state of the circulation as varying with the progress of the disorder from a small to a fuller, and from a full to a quick irregular pulse; and usually accompanied with profuse perspirations, particularly towards the close, and after the administration of opium, wine, the cold bath, &c.

Dr. Parry has adduced the velocity of the circulation as an useful criterion of the danger of the disease; and observes that if the pulse be not above 100 or 110, by the 4th or 5th day, the patient almost always recovers; but if it be quickened early that it proves fatal; and that there are few

instances of recovery where the pulse has risen to 120 on the first day.

From the effect of the paroxysms, the forehead, neck, &c. were bathed in a profuse perspiration, in the present instance. M. Larrey remarks, that when the perspiration is symptomatic, it begins upon the head and extremities; when it is critical, it occurs over the chest and abdomen: but in some of the subjoined cases, perspiration flowed very freely without bringing much relief.

As the acute form of traumatic tetanus, to which these remarks are chiefly intended to apply, is so uniformly fatal, it is of the greatest consequence to attend to whatever may assist in detecting the disease early, or in warding it off. Richerand observes, that in wounds threatening convulsions and tetanus, a persevering extension of the limbs during sleep often manifests itself before any affection of the lower jaw; and we should naturally pay more attention to any admonition of this kind in punctured or in extensive lacerated wounds, particularly of tendinous or ligamentous parts; and especially in injuries of the feet, hands, knee-joint, back, &c. in which the disease most frequently supervenes.

Though it sometimes attacks suddenly, yet in general a more gradual invasion affords some prelusive indications of danger: such as increase of

pain, irritation, and restlessness, nervous twitchings, pain and difficulty in deglutition, or in turning the head, spasms or partial rigidity of some of the voluntary muscles, pain at the scrobiculus cordis, a suppressed or vitiated state of the discharge, &c. Thus Mons. Larrey adduces several instances of tetanus in which the wound was either dry, or afforded only a scanty serous exudation, and where the symptoms were relieved on suppuration being re-established; and Dr. Reid in the Edin. Medical and Surgical Journal for July, 1815, remarks, that on removing the dressing, instead of healthy pus, the surface of the wound was covered with a darkish unhealthy looking matter, which he had in two former instances noticed as the forerunner of tetanus. The torpor of the intestines, which precedes and accompanies this disease, is highly deserving of attention. Mr. Abernethy observes that in four cases where he inquired into the state of the bowels, the evacuations were not like fæces; and he proposes as a question in investigating the cause, what is the state of the bowels between the infliction of the injury and the appearance of this dreadful malady? The testimony also of various authors as to this state of obstinate costiveness, the offensive nature of the intestinal contents, and the reasoning of Dr. Hamilton on this subject, are strongly in favour of the presumption, that the late infrequency of locked-jaw in the West Indies, in the public service, is chiefly owing to the greater freedom with which purgatives have

been employed of late years, particularly since the appearance of his very valuable publication; and, I hope, sanction the opinion I am sanguine enough to entertain of the great value of this class of remedies, if not so much for the case, at least for the prevention of tetanus. The unfavourable prognosis so often verified in tetanus, ought not to shake our perseverance in the remedies, though it must heighten our conviction of the powerful and intractable character of the complaint.

In a letter addressed to me by Mr. Grimstone in the Edinburgh Medical and Surgical Journal for October, 1815, containing some valuable practical observations, and successful cases of tetanus from the exhibition of spirits, he expresses, page 421, his inability to coincide with me in the opinion that bleeding occasionally and purgatives might be a means of preventing the disease; and adds, "however salutary bleeding might be in the early symptoms of one species, I feel confident it would prove injurious in that of which I mean more particularly to speak." It is, however, only in the early traumatic tetanus, that I meant to speak in favour of the lancet; and I cannot help thinking in a full habit, where the wound is swelled, inflamed, and painful, that the employment of this remedy, with free purging, and such other means as are calculated to allay the general and local irritation, afford the fairest chance of averting the danger.

In a case stated in the 6th Volume of the Medico-Chirurgical Transactions, Mr. Earle thinks that venæsection, though unsuccessful, was beneficial, and lessened the patient's sufferings; and in the same work it is also mentioned with approbation by the medical officers in the Peninsula. Dr. M'Arthur considers that he used blood-letting with evident relief in one case in the Naval Hospital at Barbadoes; that the spasms were ameliorated, the disease protracted, and the morbid appearances after death were less strongly marked in consequence; and he regrets not having pushed it to a greater extent at the beginning: (vide Morret's case.) M. Larrey also adduces some examples where it produced a good effect; and in my journal for August, 1807, I find a remark copied from a report of the late Mr. Hardy, then surgeon of the Jason, that though the wounds and accidents had been numerous in the West Indies, no case of tetanus had occurred; and that he was in the habit of giving opiates early in these wounds, and of bleeding and purging. The very few instances I find of the disease being at all mentioned in the registry of so many reports for several years, is the best proof how seldom it was seen, or even thought of, during the period that I was on service in the West Indies.

The exhibition of spirits with opium as recommended by Mr. Grimstone, with the view of creating, and keeping up for a certain period, a strong action in the system, independently of the support

it derives from analogy in those instances where wine has been given in large quantities with success, certainly appears from the cases with which he has favoured us to be well worthy of a further trial; and in what has been termed the chronic form, he has spoken to me with the greatest confidence of its success. Its failure off New Orleans does not argue any thing against it, under less unfavourable circumstances; for there as in the African above noticed, the dysphagia increased so rapidly as to render it impossible to administer a sufficient quantity to produce or maintain any considerable effect upon the sensorium. Indeed in those severe cases where, as M. Larrey observes, "the patient has, if not a dread of liquids, at least a great aversion to them;" and where the very attempt to swallow ultimately brings on violent convulsions, it is evident we have little or nothing to look for from the administration of remedies by the mouth; whether this state may be anticipated by opium when foreseen sufficiently early, or there is any chance of arresting it, while forming, by the most powerful exhibition of this medicine, which circumstances might authorize, or how far benefit might be expected from a strong watery solution of it, or by powerfully purgative and stimulating remedies, such as turpentine given by enema, are considerations well worthy of every attention.

In the 6th Volume of the Transactions of this Society is an instance of trismus, recorded by Dr.

Phillips, in which the jaw suddenly fell upon the exhibition of an enema with turpentine; and the circumstance is well deserving of recollection, although but little perhaps can be inferred, from an idiopathic case of this kind, as to its success in acute symptomatic tetanus. For the same reason it would be quite superfluous to say any thing of wine, the warm and particularly the cold bath, mercurial frictions, and other remedies stimulant and antispasmodic, which, besides opium internally and externally, have so uniformly failed here; though we have many examples of their success in the milder varieties. At any rate a detail of this kind would be misplaced in a paper which does not profess to give a complete account of the history and treatment of this terrible malady, but merely to offer such hints as, from reading or observation, appear to me to be most worthy of attention.

The principal reliance in our Peninsular army seems to have been on blood-letting, purging, opium and digitalis; but we learn from the valuable report of Sir James M'Grigor that very few out of several hundred cases terminated successfully.

Of the pathology of this disease, I am unable to say any thing satisfactory; nor have the dissections been sufficiently numerous to allow us to judge how far it has any essential connection with such morbid appearances as have been discovered. M. Larrey states that in the examination of the

bodies of persons dead of tetanus, he "found the pharynx and œsophagus much contracted, and their internal membranes red, inflamed, and covered with a viscid reddish mucus."

Dr. M'Arthur, in the instructive cases which he has kindly permitted me to lay before the Society, found the intestines much inflamed; and in two of them a yellow waxy fluid of a peculiar offensive smell, covering their internal surface; but whether the inflammation was primary, or only a consequence of the pressure of the abdominal muscles which contract so violently in this disease, he is unable to decide. Has the fluid here mentioned any resemblance to the "yellowish pulpy matter" which Dr. Baillie states sometimes lines the inner membrane of the trachea when inflamed in croup? In a fatal case of pemphigus which occurred to me in the Russian fleet, a yellow, glairy, gelatinous looking matter was also found in the intestines*.

The periods at which tetanus is most likely to occur, namely in an early and highly irritable and painful state of the wound, before suppuration has taken place; or when it has almost or quite ceased, and the wound is nearly or entirely healed, are particularly deserving of attention; as well as such measures as are most likely to re-establish a healthy discharge when vitiated or suppressed. With the

* Edinburgh Medical and Surgical Journal, October, 1814.

latter view M. Larrey adduces instances of his having applied blisters as near as possible to the wound, or to the wound itself, to re-excite suppuration, and with success. The indications in tetanus, he observes, "are to remove the causes of irritation, and re-establish the suppressed excretions."

He appears to me with much justice to lay the greatest stress upon the influence of changes of temperature, and particularly of exposure to the cold night air, in inducing tetanic affections; for during the occurrence of the cases he mentions in Egypt, I had above a hundred English and French soldiers wounded (many of them very badly) in the battle of the 13th of March, 1801, without any instance of tetanus supervening, at least so long as they remained on board ship under my care, which was from that period, until the end of April.

By following more attentively the apparently capricious movements of this attendant in the train of a combatant army or fleet, some further light might probably be thrown upon the history and nature of this complaint; particularly as it depends upon the influence of climate, locality, exposure to remote causes, and the state of the habit in which it is most apt to occur; but this I do not possess sufficient materials to attempt. It is however particularly gratifying, after contemplating a disease from the frequent occurrence of which, wounds and

operations sufficiently formidable in themselves, were rendered so infinitely more dangerous, to be able to offer proofs of its greatly decreased frequency of late years in the West Indies; as will be sufficiently evident by contrasting the accounts of it in the valuable work of Sir Gilbert Blane, and in those of former authors, with the following statement.

Among the vast number of wounds which occurred during upwards of seven years' service in that climate, I do not recollect having heard of above half a dozen instances of tetanus, in the naval department; but allowing that some may have escaped my knowledge, still the proportion so affected, when compared with the great number of wounded men, must be trifling indeed. That this arises from improvements in the treatment, medical as well as operative, and particularly from the greater attention paid to the state of the bowels, and not from any physical change in the climate, may be inferred from the negroes, and particularly the children, continuing obnoxious to such affections, though perhaps less frequently, owing to greater attention being paid to them than formerly; and from comparing the different results, under different modes of treatment. Thus in my registry of health for February, 1809, I find it remarked that two instances of tetanus had proved fatal in the captured French frigate La Topaze, the one a case

of amputation, the other a flesh wound in the back; while none of our own wounded suffered in this way; with a note adverting to the infrequency of the disease of late years, since the state of the digestive organs had been more attended to.

I am not able to judge as to the frequency of tetanus during the late war with America, previously to my joining the fleet upon that station; but it is natural to expect that several cases must have occurred from the nature and extent of the warfare carried on, and the number of men wounded in boats, &c. on that coast. Mr. Wilson reported to me that three fatal cases of tetanus appeared among the wounded of the Hermes, after the attack upon Fort Mobile on the 15th September, 1814, viz. from a grape-shot wound of the thigh, from an injury of the spine, and from a splinter wounding the breast and knee: and I find that a man belonging to the Endymion, died of it in the Naval Hospital at Halifax, from a wound in the knee with an axe; but with this exception, Dr. Rowland's, the surgeon of that establishment, wrote to me in September last, "that there had been only one other case of tetanus since he was in the hospital. He was, says Dr. R. one of the Dispatch's crew, who had been desperately wounded in the attack on Stonington in the second week of August. He was received here on the 18th, the muscles and integuments of the thigh were greatly lacerated, and

in a sloughing state; his right arm amputated, his bowels torpid, pulse quick, and a difficulty in deglutition. The latter symptom, in spite of opiates, cataplasms with opium, enemas and purgatives, increased daily, until the 23rd, when he died. If my memory be correct, he must have been wounded on the 13th or 14th; and there is no doubt he had tetanus on the 18th when he was received, for it is so noticed on his ticket."

Reverting to this gratifying exemption in the West Indies, Dr. M'Arthur, who left Barbadoes in 1809, informs me that only four cases of tetanus in all came under his observation, while surgeon of the Naval Hospital there; and adds, "of the numerous cases of gunshot wounds which were received under my care during nearly six years of the most active period of the late war, and of the great number of operations which it fell to my lot to perform, it is remarkable that only two cases of tetanus occurred in the hospital." In these he expresses a suspicion that it may have been favoured by a too generous diet; for it is well worthy of notice, that from the low state to which these men were reduced by the profuseness of the preceding discharge, &c. he had been induced to order them more wine and porter than had been allowed in any other instance.

From that period to 1812, when I left the coun-

try, and subsequently, as I am informed by Mr. Mortimer, who has had charge of that hospital up to the present date, the same immunity has continued. He mentions that out of 23 amputations, only one terminated fatally from locked-jaw, in which there was reason to suppose some nervous filaments had been included in the ligature. He expresses his concurrence in opinion with me, that continued purging might be of the greatest service in tetanus; and adduces a case threatening locked-jaw, where the best effects were experienced from large doses of opium, given in solution so as to pervade the system, suddenly combined with æther, and calomel in doses of half a scruple every three hours, with rum toddy frequently exhibited during the day. As however the limb was removed by midnight, it is more than probable that the operation had the greatest share in the result; for though we are too well assured by experience that amputation will but very seldom remove, we have no reason to doubt that, when necessary to be performed, it may sometimes arrest the approach of tetanus.

Mr. Sheppard, who also served in that climate upwards of eight years, states that in wounds he of course attended to the state of the bowels, and to the obviating of inflammation, as was the general practice; and that, although a large share of wounds had come under his notice, he never saw a

case of tetanus from that cause in the West Indies.

I trust I am therefore justified in inferring that to the improvements in the Medical and Surgical treatment of wounds; in cleanliness and ventilation, avoiding at the same time exposure to currents of cold air, or sudden changes of temperature; in fine to superior comforts, diet, and accommodation; but particularly to the greater attention paid to the state of the bowels, may be attributed the great infrequency of tetanus of late in the West Indies, when compared with former wars.

In conclusion, I have great satisfaction in transmitting with this report four cases of tetanus valuable from being illustrated by dissections, with which I have been favoured by my much esteemed friend Dr. M'Arthur of Walmer, as contained in the accompanying copy of a letter addressed by him to the commissioners for his Majesty's transport service, and for sick and wounded seamen.

Copy of a Letter on the Subject of Tetanus, from DUNCAN M'ARTHUR, M.D. F.L.S. *late Physician to the Naval Hospital at Deal, to the Commissioners for Transports, London.*

Naval Hospital, Barbadoes, 22nd February, 1808.

GENTLEMEN,

In my letter of the 30th of October last, I proposed to communicate to you in my next, some circumstances relative to tetanus; and with this view I now beg to submit for your consideration the four following cases, which will go far to prove, that when that disease appears to originate in dissimilar causes, it depends on, or at any rate is attended by, inflammation of the abdominal viscera; for whether it be the original cause, or only a consequence of the disease, is a question which future experience and dissections can alone determine. Placed as you are at the head of an extensive medical establishment, you might obtain from the surgeons employed under your directions, the histories and dissections of patients who may die under their care, of this disease; and should the morbid appearances resemble those I am about to relate, it may lead to a more rational mode of cure, than the present ever varying plans, which we are obliged to adopt from a want of just principles to direct our practice.

Early in May, 1806, I was requested by a parti-

cular friend to see an African boy about 14 years of age, who, he said, had suddenly been taken ill of cold, and sore throat. Upon my examining the boy, he complained of uneasiness of the throat, and a difficulty in swallowing; the jaws could not be opened to admit an inspection of the throat, a circumstance which not unfrequently occurs in cynanche tonsillaris; but no spasms were there present. He was directed to take six grains of the submuriate of mercury joined to ten of the compound extract of colocynth; he was also to use an acidulated gargle, and to have the external fauces rubbed with a stimulating liniment. In a few hours afterwards the purgative medicine not having operated, he was directed to take an ounce of the sulphate of magnesia, and in attempting to take this medicine, both the trismus and opisthotonos were first observed, and increased upon every subsequent attempt at swallowing. He now took eight grains of submurias hydrargyri every second hour; frictions with the unguentum hydrargyri first were used to the jaw, neck, arms, and thighs; and he was submitted to the cold affusion, so as almost to induce syncope. Within the first twenty-four hours he had taken 70 grains of calomel, and rubbed in two ounces of the mercurial ointment; the cold affusion had been applied 8 times, and several enemas were thrown up, but all of them were retained. The spasms recurring more frequently and with increased severity, the warm bath was substituted for the cold affusion; the mercurial frictions were

continued, and he took sixty drops of laudanum every second hour, in as much wine as he could swallow; and a blister applied to the surface of the abdomen. He died in a state of extreme misery about 48 hours from the time I first saw him. My attention during his life was directed to the abdomen, which I repeatedly pressed during the absence of spasm, without exciting pain or uneasiness. This case was supposed to have originated in cold, as he had not received any injury or hurt. Having obtained permission to open the body, I found the small and large intestines much inflamed, and in many places approaching to a state of gangrene; other abdominal viscera sound. Having observed sufficient to account for his death I did not prosecute the dissections farther; a circumstance which I now regret.

CASE II.

Jer. Collins, ætat. 30, a seaman belonging to his Majesty's ship Canada, was admitted a patient into this hospital, on the evening of the 1st of June. The jaws were not completely locked; most painful contractions of the muscles of the neck and back upon every effort at swallowing or speaking, skin perspirable, bowels bound. The first phalanges of the fore and middle fingers of the right hand had been amputated on board, about 12 days ago, and

are now nearly cicatrised. The tetanic symptoms appeared on the morning of the 31st May, soon after he had been on deck for a drink of cold water. He has taken on board under the direction of Mr. Booth, the very able and judicious surgeon of that ship, laudanum in large doses both into the stomach and by glysters. Frictions with stimulating liniments and the warm bath were also employed.

Adhibeatur quam primum enema domesticum. Descendat in balneum tepefactum. Habeat submur. hydrarg. gr. viij sub forma boli secunda quaque hora. June 2nd, unable to swallow the smallest quantity of fluid, and every effort to speak induces the most excruciating distress, no sleep.

℞ Decoct. Amyli, ℥ij

Tinct. opii ʒij M. ut fiat enema. Injiciatur.

Died at 12 o'clock.

Sectio Cadaveris.

Strong marks of inflammation both of the internal and external coats of the stomach. Villous coat covered with a peculiarly offensive smelling yellow matter, small intestines much inflamed; caput cœcum coli, and colon, bordering on a state of sphacelus; convex surface of the liver redder than usual, concave surface livid; gall-bladder turgid with bile; œsophagus inflamed to within two inches of the pharynx, its mucus yellow, resembling that found in the stomach; pharynx and parts about

the neck and jaw of natural appearance. Lungs healthy; did not examine the head.

CASE III.

Wm. Merrit, ætat. 30, seaman belonging to his Majesty's ship Blonde, was admitted into this hospital on the 25th of September, 1807, with an extensive sloughing ulcer upon the ankle, and back of the right foot. After various changes, and repeated proposals to have his leg removed, he at last consented to the operation, when the powers of life seemed too much exhausted to admit of my entertaining any sanguine hopes of his recovery; however, on the 20th of November the limb was removed below the knee. The stump looked remarkably well, all the ligatures were removed, and his strength rapidly improving, when on the 3rd of December he complained of slight involuntary contractions of the muscles of the face; 4th, considerable rigidity of the jaw, and spasms of the muscles of the neck and back, countenance mournful.

Mittatur sanguis e brachio ad ℥xviij. Descendat in bal. calidum et habeat quam primum pulv. convol. jalap. supertart. potassæ ana ℥ss.

5th. Rigidity of the jaw and spasms of the back and neck not increased, although extended to the lower extremities. The warm bath last night was followed by profuse sweating for six hours. No stool.

Habeat submuriatis hydrargyri gr. iv forma pilulæ omni tertia hora donec alvus bene soluta sit.

6th. Rigidity of the jaw and spasms somewhat increased since yesterday; pulse rose last night after taking away from the arm about sixteen ounces more of blood; had a stool yesterday after an enema, and one spontaneous loose stool this morning; skin perspirable; appearance of the stump rather unfavourable.

℞ Submur. hydrarg. Pulv. antimon. ana gr. vj.
Camphoræ gr. x. conserv. rosar. q. s. M. et divide in pilulas vj. quarum capiat duas ter die. Descendat in balneum calidum mane et nocte.

7th. Spasms of the muscles of the neck and back; more frequent deep-seated pain under the sternum; pulse low; perspires freely; one stool. Repetantur pilulæ ut heri. Adhibeatur emp. lyttæ sterno.

8th. Much as yesterday, perspires less, bowels

bound. Repetantur omnia. Injiceatur enema catharticum.

9th. Slept better than he has done for several nights; muscles of the jaw more relaxed; spasms much as usual; had an enema last night, which is still retained; stump unhealthy. Continuentur pil. et baln. calid. Injiceatur enema.

10th. Passed a bad night; spasms severe; a gangrenous spot on the anterior edge of the stump; one free stool; continuentur omnia ut heri. Habeat etiam haust. anod. ex tinct. opii 3j. hora somni.

11th. Every appearance of approaching dissolution; inside of the lips slightly ulcerated, as if by the action of mercury; no ptyalism. Died at 2 p. m.

During the continuance of the disease, the jaws were not so much shut as to prevent his receiving nourishment, especially after the second bleeding.

Dissection.

Stomach much drawn up under the diaphragm. Intestines in several places inflamed, chiefly the ileum; stomach and intestines inflated with air; no

mark of disease in the œsophagus, pharynx, or larynx.

CASE IV.

William Harris, seaman belonging to his Majesty's brig Curieux, badly wounded in the left arm near the shoulder, was received into the hospital on the evening of the 4th Dec. 1807. He would not submit to the removal of the arm that night, but next morning it was taken off at the shoulder-joint. In consequence of the extensive injury the soft parts round the shoulder had received from the wound, the upper flap fell into gangrene, and partially sloughed. On the 13th of December all the diseased parts had separated, and the ligatures had come away. The appearance of the wound was altogether healthy.

Dec. 16th, was restless, and somewhat delirious in the night, pulse sunk, granulations of the wound pale, bowels open. His wine and porter to be continued.

Haust. anod. hora somni.

17th. Complained last night of stiffness of the jaw, and contractions of the muscles of the face and neck; took sixty drops of the tinct. opii at bed-time, and repeated it in the night. This morning the spasms of the neck extended to the

back, and are increased in frequency and violence; pulse quick, and scarcely perceptible. Habeat tinct. opii 3i tertia quaque hora, vel pro re nata.

18th. Spasms continued with unremitting violence. Was put into the warm bath last night. Died at 9 o'clock this morning.

Dissection.

Stomach singularly contracted, internal coat exhibiting appearances of inflammation, and much yellow-coloured mucus adhering to it. Portions of the intestines inflamed, particularly the ileum; a very extraordinary yellow fluid, resembling that in the stomach, was in great abundance in every part of the internal canal, which, upon cutting into the intestine, effervesced on coming in contact with the external air; liver diseased; did not examine the thorax or head.

These are the only cases of tetanus that have occurred to me during a period of nearly four years in which I have had charge of this hospital, where a great number of wounded men including prisoners of war, as well as our seamen and marines, have been received; and where a great many operations, in consequence of wounds and ulcers, have been performed. Inflammation of the stomach and intestines, and in two cases a peculiarly offensive smelling yellow matter, pervading the intestines, were

the most prominent morbid deviations from health which were discovered upon opening the bodies from four to six hours after death. But whether the inflammation be a primary or secondary affection, I am not prepared to answer. In severe instances of the opisthotonos, no doubt the pressure of the abdominal muscles on the contained viscera might induce inflammation, for when the muscles of the neck and back are thrown into contractions, the abdominal muscles act as antagonist muscles with great violence; and the abdomen, during the continuance of the spasm, feels hard like a board under the hand.

The inflammation in this disease is different from enteritis, or from that which is present in persons who die of the endemial fever of the country. In enteritis the intestines often adhere to one another by layers of coagulable lymph, recently thrown out; flakes of curdled matter are often found, and pus sometimes is formed. In the inflammation attending tetanus there are no adhesions, no formation of pus.

In the endemial fever the whole of the small intestines is more uniformly inflamed; the internal coats of the stomach and intestines exhibiting gangrenous spots and patches. The colon always contracted, but very rarely inflamed. In tetanus the colon was equally inflamed with the small intestines, and not contracted.

The yellow matter found in the stomach and intestines is very remarkable. It occurred in Collins and Harris, both of them treated on the stimulating plan, and it is probable had the intestines in the first case been opened, a similar matter would have been found. Is it to be considered a feature of the disease? or was it the consequence of the quantity of laudanum exhibited?

Merrit obtained an evident relief from bloodletting, and the warm bath. The disease was longer protracted, and the morbid appearances after death were not so strongly marked as in the other cases. The blood drawn shewed no signs of inflammation.

It is remarkable formerly, that tetanus should have been a very frequent disease in the West Indies; and now that it is scarcely known in the navy and army; but an inquiry into the causes which have contributed to render this disorder less frequent is not my present object; I only wish to draw your attention to the obtaining of information of a disease, the nature of which is so imperfectly known; and which, when it does occur, is one of the most fatal to which man is obnoxious.

I have the honour to be, Gentlemen,
Your most obedient and very humble Servant,
D. M'ARTHUR.

The Commissioners for Transports, &c. &c. London.

ACCOUNT OF A CASE

OF

CURIOUS IMPERFECTION OF VISION.

BY WHITLOCK NICHOLL, M.D.

OF COWBRIDGE.

COMMUNICATED BY

MR. BRODIE.

Read June 25, 1816.

IN the Philosophical Transactions, there is an account of a remarkable imperfection of sight, which was hereditary; a similar imperfection exists in a relation of mine, a statement of which I have now the honor of laying before the Medical and Chirurgical Society.

The subject of the present case is a boy eleven years old, clever, lively and healthy. His eyes are grey, with a yellow tinge surrounding the pupil. He does not call any colour green. Dark bottle green he calls brown, confounding it with certain browns. Light yellows he calls yellow, but darker

yellows and light browns he confounds with red. Dark brown he confounds with black. Pale green he calls light red; common green he terms red. Light red and pink he calls light blue; red he calls by its proper name. Blue, both dark and light, he calls blue. On looking through a prism he said that he could discover no colours but red, yellow and purple. I shewed him paper stained with red radish-root, this he said was blue; I dipped this paper in diluted nitrous acid, which converted the pale red colour into scarlet, he then called it red. I placed this scarlet colour by the side of paper stained with litmus; he said that both colours were the same, but that the litmus paper was a lighter shade than the other. I then placed the scarlet paper on the grass, and afterwards on green baize; he said that the grass and the baize were of the same colour as the paper, but that they were a shade lighter. I made him put on a pair of green spectacles, which he called *red* glasses; he said that every body and every thing in the room had a reddish cast when seen through them. The border of the room had a blue leaf with a green edge, this he called a blue leaf with a red border. A woman passed by with a basket on her arm; he told his mother that the woman had fowls in it, for that he saw the *red* feathers hanging out; these proved to be *green* leaves with which she had covered her butter. I tried him in a variety of ways, and found him always consistent; he told me at last, "What

you call purple and pink and blue, are so like each other that I cannot well know one from the other." His mother told me that he called the crimson moreen curtains of his bed red by candle-light, but that when he gets up he says that they are dark blue. I asked him what the colour of the eyes of one of his sisters was, he said " a bluish red *." Her cheeks he said were a purplish blue.

This boy has four sisters, in neither of whom does this imperfection of sight exist. He has an infant brother of whose vision nothing of course can as yet be known. The peculiarity of sight as to colours is derived through his mother, in whom however it does not exist; she has a sister who is also free from it, but she has no brother. Her father, who is now living, has this imperfection of vision. This gentleman, Charles ———, had two brothers and three sisters; one of the brothers (John) had also this peculiarity, but the other brother and all the sisters were without it. John had male children who died young, of whose vision nothing is known; he left a daughter now living, who is free from it; she is married, but has no children. Charles was in the navy, and several years ago he purchased a blue uniform coat and waistcoat with *red* breeches, to match the blue. I asked him once the colour of some

* Her eyes are grey.

railing which was painted a dark *invisible* green; he said it was singular that it should be coloured red, which he considered it to be. I shewed him a doyley which was red, having a leaf of the same colour traced out on it, and I asked him the colour of it. He, having been so often mistaken and laughed at, said with a degree of triumph, "Why the ground-work is red, but the leaf is of course green." It is to be observed, that neither he or his grandson use the word green as a term chosen by them, but they employ it only when they suspect or know that the colour is what others call green, such as the colour of grass or of leaves; for instance, when I began my examination of the boy, I asked him the colour of a leaf of trefoil: "oh," said he, "I know that it is green." But when I afterwards placed it by the side of the radish-paper which had been dipped in diluted nitrous acid, he then said that the paper and the leaf were of the same colour, and that he should call the colour of the leaf *red*, but that he knew that others called leaves green. John ———, his grandfather's brother, has mistaken a cucumber for a lobster, and a green leek for a stick of red sealing-wax. His daughter was one day dressed in a pink slip; she asked him the colour, he said "sky blue," to which she replied, "If you call my pink slip blue, what do you call my pink face?" to which he answered, that the colour of her cheek and that of her slip, though she called both pink, did not appear

to him the same, but that he could not describe the difference. He never called blue pink; nor red green; though he called pink blue; and green red*. I have not been able to ascertain whether any of the predecessors of John and Edward had this imperfection of vision.

* This may be observed likewise of Charles and his grandson.

ON THE TREATMENT OF SINUOUS ULCERS.

BY HENRY DEWAR, M.D. F.R.S. Ed.

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COMMUNICATED BY

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"What the knife cures, it partly destroys; what the bandage cures, it saves."

John Bell's Principles of Surgery.

FINDING the modern treatment of suppurating sinuses to labour under great deficiencies, I took occasion last summer to circulate some observations on the subject in the military hospitals of Flanders, after the battle of Waterloo, in the form of a letter to a friend employed in that service. They first occurred to me in the year 1799, when I served as hospital mate at Colchester on the return of the British troops from the Helder, although I was not then sufficiently sanguine to make any attempt to call the attention of the profession to

the subject. I hope that the following observations, if allowed a place in the Medico-Chirurgical Transactions, will attract the general attention of professional men, and will secure for the subject the notice which is due to it in future systematic books of surgery.

The importance of sinuous ulcers, their frequent tediousness, and the want of success experienced in this department of practice, have induced authors to give a variety of directions as to their treatment. At one time large poultices are recommended for promoting suppuration; at another, acrid injections or the introduction of setons, for exciting a gentle inflammation favourable to adhesion. We are generally advised to lay open a sinus along its whole course, for the complete discharge of the matter, or to make for that purpose a new artificial orifice, called a counter-opening. Most writers say nothing of the effects of compression, and none describe the mode of applying it with that fulness and particularity which are necessary. Hence sinuses, which might be speedily healed up by good management, are suffered to spread without resistance, and to destroy the patient by profuse suppuration. In other instances extensive incisions are made, which give unnecessary pain, and retard the cure by the extent of artificial injury which they occasion; and, even where compresses and bandages are used, they are not managed in

such a manner as to secure the adhesion of the sides of the sinus.

It is to the neglected subject of the order and gradation of the pressure applied, that I now wish to call the attention of the Society. I shall therefore describe it as adapted to those cases in which it is attended with most conspicuous benefit; namely, extensive sinuses among the muscles of the thigh. These occur chiefly in consequence of abscesses formed under the *fascia lata*, and of gun-shot, and other deep-seated wounds. The anatomy of the thigh subjects it in a particular manner to extensive sinuses. The tough unyielding substance of the fascia prevents the matter from pointing outwards; so that it extends interiorly in all directions. This extension is promoted by the looseness of the cellular membrane, the number and length of the muscles that pass along the femur, their narrow and distant attachments, together with the divergency of some of them at their upper ends, where they are connected with the bones of the pelvis. In consequence of these circumstances which deprive the cellular membrane of firm support, the pus quickly diffuses itself through it, and from its presence as a foreign body, and probably from a specific action on the living parts, produces such a spreading of the suppurating process, that the quantity of matter secreted soon becomes enormous. Large sinuses thus formed after gun-shot

wounds, have been too generally considered in the army as bad cases, in which extensive and continued suppuration is unavoidable, and the helpless practitioner is obliged to wait the uncertain issue of a tedious process. Where the whole muscles of the thigh are separated like those of a dissected limb, the extent of the evil, and the large blood-vessels that are in the way, render it impossible to lay open all the branches of the sinus, and the formidable nature of the disease seems in fatal cases to exonerate the practitioner from all blame. The methods of dressing in general use may be reduced to two; one is, to put a loose roller over the whole, or to be satisfied with a covering in the form of a towel, containing a large poultice; that the parts may be kept easy, and that the matter may have a free exit. Under this management there may be an overflow, but there is no evacuation. The cavity continues so much filled with matter, that one laborious and altogether ineffectual part of daily duty is, to force it out by pressing the integuments from the extremities towards the orifice of the cavity. The disease is still allowed to extend interiorly, and no decisive effort is made to bring on a process of adhesion. The other mode of bandaging is, to apply a roller with considerable tightness, but with equal pressure over the whole thigh, beginning at the knee-joint, and carrying it regularly upwards by successive turns, passing it over the orifice in its way, and fixing it at the upper part of the thigh. This application is equally ineffectual

with the preceding. It cannot produce an immediate adhesion of parts so extensively divided, and kept asunder by a profusely secreted pus; and it leaves them in the same state by pressing those parts which are nearest to the orifice, as much or more than those which are remote. In general, it so presses the orifice itself, as to retain forcibly the whole pus formed between the times of dressing, and thus to increase the irritation excited by the presence of a foreign body. It even impels the matter beyond the parts to which any portion of the bandage is applied, and thus greatly promotes the extension of the sinus.

A case of this kind, which I was employed to dress in the routine of duty, had been bandaged in the manner now described. The process of suppuration was advancing, there was not the slightest tendency to a recovery, and the strength of the patient gradually declined. The consequences of the treatment which I am now to recommend fulfilled my best hopes, and furnished a useful lesson for the practical surgeon. Though no journal of the case was kept, the facts will be easily understood, and the utility of the practice, I hope, established without that aid; as its merits do not depend entirely on the results of clinical experiments, but are plausibly supported by the soundest data. It has long, indeed, escaped general attention, and therefore requires minuteness of detail. But it is worthy of all the pains that can be taken

to inculcate it, and if the object can be thus obtained, there will be little reason to repine at any charges of superfluous importunity which a reiteration of zealous expressions may incur.

The following is the method to be substituted for the preceding expedients. A few turns of the roller should first be made *with considerable pressure* over one extremity of the femur, and then over the other, so as to reach with all possible certainty the extremities of the large sinus, into which the whole cellular interstices of the parts have been converted. It is safer to begin beyond the sinus than to run any risk of falling short of its extremities; and, in some cases, it might be proper to increase our security by means of partial compresses extending somewhat higher than it is possible to apply the turns of the roller itself. It is now fixed in its situation with a pin. A considerable pressure is easily borne, as no high inflammation is present, and the evacuation of the pus, by reducing the circumference of the limb, soon relieves the veins from any turgescence arising from the pressure to which they may have been at first subjected. In country practice, when a surgeon has been newly called to an old case of this kind, and a considerable interval may elapse before he is to repeat his visit, the swelling of the lower part of the limb may be obviated by bandaging it upwards from the toes. After fixing the bandage on the thigh at the degree of pressure which I have

described, the surgeon may, if he chooses, make two or three lighter turns on the tumid part to assist the depletion of it; taking care that these press so lightly, as in no degree to counteract the operation of the first turns made at the extremities of the sinus. The change which this application produces is almost immediate. Part of the matter with which the integuments had been distended, is irresistibly forced a certain way towards the orifice; and no newly secreted matter is suffered to lodge in that quarter. On the second day, the limb is found somewhat reduced in size, and the bandage may now be applied more extensively. On the third day, it may be so applied as to be kept on for several days without alteration. The same degree of pressure is always to be continued over the extremities of the sinus, and several additional turns are to be made, gradually looser, alternately above and below the orifice, and approaching to it in both directions, but not reaching it. If there are two orifices, one of them, by which the matter can be freely brought away, is to be left uncovered with the bandage, and the other allowed to heal up. There is no necessity for selecting the most dependent one for that purpose, as any advantage derived from the tendency given to the course of the matter by its own weight, is not worthy of attention under a treatment implying means of evacuation otherwise so powerful. The anterior orifice will often be found the most eligible, as it is examined and dressed with greatest convenience.

During the alternate application of the bandage to the higher and the lower part of the thigh, it is frequently and variously *crossed* on the side of the limb opposite to the open orifice, and thus a propulsion of the pus is commanded in every direction to that outlet. A considerable part of the surface surrounding it is left uncovered, and the bandage is finally fixed. Over the orifice such light dressings are subsequently applied as will make no resistance to the discharge of the purulent matter. The firm propelling bandage is kept on without alteration, except when it becomes loose in consequence of a reduction in the size of the limb; although cleanliness requires the dressing immediately over the orifice to be changed daily or oftener. Thus all unnecessary trouble is prevented, an object which is sometimes of importance in securing the more perfect performance of those offices which are really necessary.

When no further cause of disease has existed besides those now mentioned, and when the pus is the only foreign body contained in the cavity, the process of adhesion soon begins at the extremities of the sinus. The principles of adhesion have been very well understood since Mr. John Hunter wrote on the subject; but it will be useful on the present occasion to remark, that a considerable pressure over relaxed parts promotes it independently of the evacuation of the pus, by affording mechanical support, in the same manner as it promotes the

healing of the relaxed surfaces of ulcers. It thus supersedes the stimulant injections which have been so often employed for the purpose of inducing rawness. The process of adhesion advances by successive steps from the extremities towards the orifice of the sinus, which even in the end requires but little pressure. The discharge quickly diminishes, and shews a proportional diminution of internal disease, and the parts heal in the same kindly manner as a superficial abscess among firm integuments after the pus has been discharged. In the case to which I have alluded, these effects were amply and speedily obtained. Both the patient and the medical gentlemen who saw it were surprised at the celerity of the cure. But it was not to my knowledge made the subject of any discussion or conversation, farther than by being mentioned as a remarkably fortunate case. The only circumstances, then, systematically attended to in the application of bandages, were the neatness and smoothness of their appearance, and the utility of the uniform pressure recommended by Mr. Baynton in superficial ulcers. A pressure greatest at the remote part, and gradually declining towards the outlet of a sinus, to give the compressed fluid a safe direction, and to secure the commencement of adhesion in that quarter in which it is not liable to future interruption, though obvious dictates of surgical science, were never thought of.

As all the books now put into the hands of young

surgeons are deficient in this particular, I have made an extensive inquiry into the works of the older writers, to learn if a method so obvious had not formerly occurred. I have found the practice in this respect somewhat varied, but in general negligent. Avicenna directs the surgeon to begin his compression *at the orifice* of a sinus. Others more properly prescribe an order the reverse of this, yet leave the rules of management in other respects vague. Hence no succession is understood to be necessary in the degree of force; the pressure is in almost all cases too slight, and applied over too narrow an extent of surface. It ought always to be applied over the whole thigh in the manner which has been here described, even though the limits of the sinus should be inconsiderable. On reading the scanty observations to be met with in books on the mechanical part of the treatment of sinuses, a young surgeon will at most figure to his mind a narrow passage, the sides of which he must endeavour to bring together. Even if he justly thinks of applying pressure first over the fundus of it alone, which is rarely the case, his views extend no farther than to the compression of the part itself, and the instrument which he contemplates for the fulfilment of his object is a compress nearly of the shape and size of the sinus. On actual application, this may be suspected of being liable to shift, and the sinus may then extend in directions in which nothing was apprehended. There may be narrow communications with the adjacent parts

of the cellular membrane; and the effect of a limited pressure, though directed accurately over the present sinus, will be, to send part of the matter in different lateral or ulterior directions, extending the bounds of some unknown branch of the sinus, or creating a new one in the looser cellular membrane. No directions are given to keep this pressure in a fixed state; it is liable therefore to be altered: the internal surfaces are shifted at every time that the dressings of the orifice are renewed; and the process of adhesion is perpetually disturbed. An extended compression of the neighbouring parts is necessary to secure the expulsion of the matter; steadiness is necessary to the advancement of adhesion. The general method here pointed out is on various accounts required to retain the parts in such a disposition as will obviate the extension and terminate the duration of a state of disease.

I have had the pleasure of finding that all the older writers are not equally deficient in their practical precepts on this subject. Galen, Ætius, Paulus Ægineta, Heister and Tagault give luminous and precise directions on the gradation of pressure. Those of Galen are to be found in his treatise entitled Τα διαπνοτικα addressed to Glaucus. It is not necessary to transcribe the whole passage, the style of which is somewhat prolix; but those who take an interest in the antiquities of medical literature will find pleasure in reading it. I shall

only select from it the following expressions. Αἱ δὲ περιβολαὶ των οδονιων σφιγγετωσαν μεν ανωδυνως τον πυθμενα του κολπου, κατα βραχυ δ' επλυεσθω αχρι του στομιου. "Let the turns of the linen bandages constrict (though without pain) the further end of the sinus and be made gradually looser towards the orifice." After some more minute observations he adds, Εἶναι δε το στομιον χρη, μη παυυ προσεστυπομενον αλλ' ὡστε δυνασθαι τον ἰχωρα του κολπου παντα κενουσθαι δι' αὐτου. "It is necessary that the orifice should not be at all compressed, but kept so free that the whole matter of the sinus may be evacuated by it." Ætius and Paulus deliver the same precepts and nearly in the words of Galen. The directions of Heister to the same purpose are contained in Part I. Book 2. Chap. II. § 2. of his *Institutiones Chirurgicæ*. Yet this author appears not to entertain a high enough idea of the degree of pressure necessary to secure the object, as he considers the dependent situation of the orifice as a matter of considerable importance. In other respects, his directions so completely coincide with those of Galen, that it is quite unnecessary to quote the passage. The case is the same with Tagault in Book 3. Ch. 17. of his Treatise on Surgery. Fabricius and many other writers entertained no expectation of the possibility of producing universal and permanent adhesion in large sinuses by compression. This writer says that, in obstinate cases, he sometimes closed and healed up the orifice and the adjoining parts, to gratify the

patient, though fully aware that a fresh abscess would in a short time be formed. The remedies in which he and his cotemporaries chiefly confided were the *agglutinantia*. It is not out of place here to remark, to the honour of Galen's discernment, that though he uses an equivalent term, τα κολλησοντα, to denote such medicines as produce adhesion, he does not include in that list some which came into common use in the subsequent dark ages of surgery, such as isinglass and others, which were expected to operate on the same principle with carpenter's glue; but warns the practitioner against them, as substances which can only have the same effect with the lodging of foreign and impure matter. His κολλησοντα are wine and other stimulants, which might at the present moment be used on the most approved and accurate principles of surgery.

The mode of bandaging now described will possess considerable advantages in cases of more complicated disease. If pieces of cloth, splinters of bone, or other foreign bodies are present, it will tend to expel them by the ready evacuation which it effects. If it does not expel them, yet, by reducing the local disease to the spot in which they are lodged, it procures for the practitioner sure information of their presence, and thus gives him an opportunity of using his best endeavours to remove them. In all cases it must facilitate recovery by circumscribing the local disease; even where

the bone is fractured by a musket shot, it will have the effect of reducing the disease more nearly to that of a common compound, and soon to that of a simple fracture.

When the discharge from a sinuous ulcer is fetid and ichorous, shewing an unhealthy state of the parts, some might be disposed to expect less advantage from this mode of bandaging. This most frequently occurs among numerous tendons or ligaments, as in the ham or in the foot, and arises in some measure from the nature of that species of structure, and the forcible separation of the parts attending it; and the disease will in some degree yield to the powerful compression of a bandage diminishing the contrast between the firmness of the ligaments and the openness of the intervening spaces. In many cases a healthy action may thus be established, especially if the aid of stimulant injections is superadded.

It is scarcely necessary to describe the modes in which the same principles may be applied to the treatment of sinuses in other parts of the body. In the arm and leg there will be no occasion to deviate from the exact form of the bandage as already described. When a sinus exists under the integuments of the foot extending among the ligaments and tendons, many respectable surgeons lay them open the whole length of the foot, and then

use means for healing up the cavity by granulation. This harsh operation may evidently be superseded by the bandage applied according to the principles above explained, and with a tightness proportioned to the resistance which it receives from the structure of the parts.

In sinuses occurring among the integuments of the trunk, greater address is required, and in many cases the success of the most judicious management must be uncertain, as we have not such points of support as will afford complete security against the extension of the sinus to the great cavities of the body. In some cases a compress in the form of a crescent might prove useful for preventing the spreading of the suppuration in various directions, and thus promoting the tendency of it to the orifice. The open part between the horns of the crescent will correspond to the outlet.

In situations in which the inequalities of the bones are unfavourable to the fairness of the pressure, compresses may be interposed suited to the shape of the interstices. Le Dran describes a very instructive case of suppuration under the pectoral muscle, which deserves to be mentioned as affording a beautiful illustration of this method of cure, under slight variation of the instruments employed, as suited to the situation of the disease. An abscess had begun in the axilla of his patient,

and extended under the pectoral muscle to the clavicle. This gentleman made an opening at the lower part of that muscle, and ascertained by the probe that the sinus extended to the periosteum of the clavicle. He dressed it for several days with digestive ointment, and introduced a dossil of a flat shape armed with this ointment to the extremity of the sinus. In eight days after, he dressed it with what he calls a mundificant, and then (to use his own language) left the bottom of it to nature. These means may have been very useful in this case to produce adhesion in a part to which compression could not be applied with full security of success. But his practice in that respect seems to have been partly founded on a persuasion of the necessity of producing such a secretion as would not create disturbance by its unhealthy qualities. But it was now, when he considered himself as leaving the case to nature, that he shewed most clearly the soundness of his judgment. To assist nature, he made use of an expulsive compress, which was long and narrow. This was first applied transversely under the clavicle, one close to the bone. Next day, another was applied of the same length, but somewhat broader, and the breadth of these compresses was daily increased, a free drain being always left for the matter. The quantity of pus was very extraordinary; but the sinus was healed on the thirteenth day, and the wound soon cicatrized by being methodically

dressed. He warns the surgeon not to apply the expulsive compress to the whole extent of the sinus, because it may compress too strongly between the remote part of the cavity and the orifice, and thus counteract the re-union by restraining the evacuation of the pus. He might have added that it is more difficult, even though the matter is evacuated, to produce a healthy adhesion simultaneously over a large extent of diseased parts than to effect the adhesion by successive steps.

Edinburgh, 29 June, 1816.

SOME OBSERVATIONS

ON A

SPECIES

OF

PULMONARY CONSUMPTION,

VERY FREQUENT IN GREAT BRITAIN.

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COMMUNICATED BY

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To many physicians there will probably be nothing new in the following observations; but this remark I believe will not apply to the greater number of medical men, because it is very common for the different species of pulmonary consumption to be regarded as the same disease, and treated in the same way; nor is it probable that the species which I am about to consider will be generally distinguished till some separate treatise, which as far as I know has not yet appeared, calls the attention of to it; yet it will be evident, I think, from

the following observations, that its nature is very different from that of other species of the disease; and that while, under the common treatment, it is nearly as fatal as these species, under that which is suited to it, its progress may generally in the earlier, and sometimes even in the more advanced stages, be arrested.

I shall, in the first place, point out the symptoms by which this species of pulmonary consumption is distinguished; then make some observations on its causes, and point out the analogy, which exists between it and many diseases apparently altogether of a different nature; and in the last place, I shall detail the plan of treatment, which I have found most successful in it.

Of the Symptoms.

I had occasion, twelve years ago, to mention this species of consumption and the plan of treatment adapted to it, in the second edition of my treatise on Febrile Diseases. Since that time it has particularly attracted my attention. It cannot therefore, I think, fail to be of some use to those whose attention has also been directed to it, to see the observations I have been led to make in so many years' pretty extensive experience of it; for there are few diseases so frequent in the part of England in which I reside, and indeed, I believe, in most parts of Great Britain. To those whose attention

has not yet been particularly directed to it, any observations on the subject must be useful.

It is not my intention to give a detailed account of the symptoms of this species of phthisis. I shall only mention the symptoms and modifications of symptoms by which it is distinguished. Contrary to what is usual in other species of the disease, the spirits from the beginning are generally more or less depressed, and the countenance is more sallow than usual. The cough at first is generally dry, or the patient brings up a little mucus after a severe, and often long continued fit of coughing, which seems to be rather the effect of the irritation of coughing than any thing which had previously existed in the lungs; for the cough in this species of consumption, particularly in its early stages, frequently comes in violent fits, in the intervals of which the patient is often but little troubled with it. These fits are particularly apt to occur after he has eaten, especially if he has eaten a great deal, or any thing by which the digestion is disturbed; and on lying down. In many instances they are most apt to come on when he lies on the left side, sometimes when he lies on the right. I think in almost all cases, they are least apt to occur in the recumbent position, when the patient lies on the back with the shoulders a little raised; and it often happens in the more advanced stages, long before the strength is much exhausted, that this is the only position in which he can lie without inconve-

nience. As in all other forms of phthisis, so in this it is common for the cough to be troublesome for some time after awaking in the morning.

As the disease proceeds, the cough becomes more frequent, returns less decidedly by fits, and is attended with a more copious expectoration. In all these respects there is of course considerable variety in different cases, but in almost all the general character here pointed out may be observed. The matter expectorated is at first limpid and glairy; by degrees we see intermixed with it small portions of an opake pus-like substance, the proportion of which in the progress of the disease increases; and in some cases the quantity expectorated is astonishing, often much greater in proportion to the severity of the other symptoms, than in other species of phthisis. I have often seen half a pint or more of pus-like matter mixed with tough phlegm expectorated daily, when the other symptoms were comparatively mild. In other species of phthisis, very copious and long continued expectoration of pus-like matter is less common. In them such copious expectoration generally arises from the bursting of a vomica. The matter it contained, if not sufficient to occasion suffocation, being brought up, the quantity expectorated is again reduced till another vomica bursts.

Bloody expectoration is by no means uncommon in this species of phthisis. Blood often appears

early in the disease mixed with the colourless phlegm. After the pus-like expectoration commences, if blood has not previously appeared, it is much less apt to appear than in other forms of the disease. If it appear even in small quantity after this stage commences, the case generally proves fatal. While the blood is mixed only with a transparent fluid, there may be good hopes of recovery, certainly better than under the same circumstances in any other species of phthisis. A similar observation applies to the pus-like expectoration. If there be no admixture of blood, there may be good hopes of recovery, if the disease has not lasted long; and certainly much better than under the same circumstances in other species of it, though expectorated matter is less apt than in these to assume a sanious appearance; but when this occurs, it seems to indicate nearly as much danger as in them. If this happen under the proper treatment, there is no hope. Nearly the same may be said of every admixture of pus-like matter and blood occurring under these circumstances.

I here wave all discussion respecting the means of distinguishing pus and mucus. In my treatise on febrile diseases, I have considered the question at length. It is necessary in practice to have means of judging independent of nice experiments. Whether the matter I call pus-like, be pus or not, is not here the question; it is that to which the

observations, which I am about to lay before the reader, apply. The only criteria, which I have found necessary in practice, are its pus-like appearance, and its sinking when so agitated in water as to separate it from the tough mucus, with which it is mixed. I am inclined to think that this substance is almost always real pus. But if we know what states of disease are connected with what appearances in the expectorated matter, it is of comparatively little consequence whether what we see be pus or not.

The breathing in the earlier stages of this species of phthisis, is sometimes more oppressed by the recumbent posture, than in other forms of the disease; and is more frequently attended with a sense of tightness across the pit of the stomach. The same observations which apply to the cough in the recumbent position, and after eating, apply to the dyspnœa; but it often happens in the early stages, that there is little or no dyspnœa; and there is very rarely, except in the advanced stages, that marked dyspnœa on exercise, which so frequently attends even the commencement of other forms of the disease.

There is often little or no pain. In many cases the patient is subject to a dull pain in the pit of the stomach, or pretty low down in the left side of the chest; more rarely the pain is in the same part in the right side. There is hardly ever a fixed pain

high in the chest, although in some cases there is an uneasy sensation and a sense of oppression under the sternum. The patient sometimes complains of darting pains in various parts of the chest, and frequently in more distant parts, particularly in the limbs, back and shoulders, and is often subject to headach.

The hectic fever in the earlier stages is hardly ever so completely formed as in other species of phthisis, and sometimes there is a copious purulent expectoration with but slight fever, and that not at all assuming the form of hectic, the skin remaining dry in the morning, and there being little or no evening exacerbation; a state of the symptoms hardly ever observed in other forms of the disease.

The emaciation is seldom so rapid as in other species of phthisis, but seems to keep pace with the state of the fever.

Such is the manner in which the symptoms common to all forms of phthisis are modified in this species of it, but a diagnosis resting merely on the modification of symptoms must always be fallacious; it is therefore fortunate that in the present instance, there is superadded to the usual symptoms of phthisis, others peculiar to this species, by which, with very little attention, it may always be distinguished; symptoms indicating a deranged

state of the digestive organs. The patient is often distressed with flatulence and irregular bowels, the tongue is furred, the appetite for the most part, contrary to what is usual in other forms of the disease, much impaired, the fæces seldom well coloured, and the epigastric region more or less full and tender on pressure. These symptoms vary much at different times, but the patient is hardly ever free from them. The connection between them and the pulmonary symptoms is rendered evident by the latter increasing with the former, so that when the epigastric region is very full and tender, the cough and dyspnœa are more troublesome; and on the fulness and tenderness subsiding, the pulmonary symptoms abate. Even the rising of wind from the stomach often, for the time, removes the tendency to cough.

The foregoing are the symptoms of the more early stages of that species of phthisis which I am endeavouring to distinguish, because I have found it requires a very different plan of treatment from other forms of this disease. In its advanced stages, it approaches more and more to these forms. All the symptoms, which more particularly indicate a tubercular state of the lungs, shew themselves; the cough is more constant, and partakes more of the hacking kind; the breathing is more affected by exercise, the hectic is more completely formed, the fulness and tendency of the epigastric region are often lessened, and sometimes wholly disap-

pear, which, if the pulmonary symptoms continue unabated, always, I believe, affords a fatal prognosis. The patient at length sinks with precisely the same symptoms as in other species of phthisis. In addition to these, particularly if the affection of the digestive organs has been neglected, some of the more prominent consequences of this affection sometimes shew themselves, particularly dropsy of the belly, which I never knew to supervene in other cases of phthisis.

Of the Causes.

The species of phthisis which I am considering arises from all the causes of this disease, with the exception of those whose operation is confined to the lungs themselves, the inhaling of dust, other diseases of the lungs, the bones pressing unequally on them, &c. yet its causes are not less numerous than those of other forms of phthisis. To compensate for the want of those causes immediately affecting the lungs, we have a numerous set of causes affecting the digestive organs. Drunkards, at that time of life which disposes to phthisis, frequently fall a sacrifice to this form of the disease; and those who have been long subject to severe attacks of dyspepsia, and what are called bilious complaints, are liable to it. In short we perceive equally in its causes, as in its symptoms, its connection with the state of the digestive organs, from which it may be justly termed dyspeptic phthisis.

It particularly deserves attention, that, in many families, this form of the disease alone appears. When this is the case, its fatal effects may generally, I believe, be prevented by carefully avoiding the causes which tend to debilitate the digestive organs, and watching the first approach of the disease.

Of the appearances on dissection.

The appearances of the lungs are generally much the same as in other cases of phthisis; but we almost always find at the same time, either a diseased state of the liver, or traces of disease having existed in it. In cases where the disease of the liver has been severe, and the patient has died as much of this disease, as of that of the lungs, I have repeatedly found those parts of the lungs in the neighbourhood of the liver, alone affected, the left side appearing sound or nearly so. In general, however, the affection of the liver seems to have little immediate share in the cause of death, and the patient lives, as in other cases of phthisis, till almost the whole lungs are rendered incapable of their function. Here, as in many other cases, we often have occasion to remark to what extent change of structure even in the vital organs, may go without destroying life, when the change is very slowly effected; a circumstance which, perhaps more than any other, shews the resources in the structure of the body [illegible] the effects of disease.

It is not at all uncommon in dyspeptic phthisis to find the spleen as well as the liver diseased. As the cœliac artery dividing into three branches supplies the liver, stomach and spleen, may we not suppose that the pain so frequently felt in the left side and in the stomach in this form of phthisis, arises from more than the due quantity of blood being thrown into the vessels of these organs in consequence of the obstructed state of the liver? is it owing to their being supplied by the same artery, that we so frequently find a diseased state of the liver and spleen in the same subject, and that inflammations of these organs so frequently alternate with each other? I have repeatedly seen the inflammation pass from the one organ to the other, and back again to that first affected.

Of the nature of dyspeptic phthisis.

It is impossible to observe even in a cursory manner the symptoms of this disease, without remarking that the state of the lungs is connected with that of the digestive organs. Its causes we have seen afford the same inference, and in those who die of it, I have just had occasion to remark, we very frequently find a diseased state, or proofs of a diseased state having existed in one of the organs of digestion, whose intimate sympathy with the others, numberless observations prove. A question of the first importance in the treatment of this disease here arises. What is the nature of the

relation observed between the affection of the lungs and that of the digestive organs in this species of phthisis? is the one a consequence of the other, or are they simultaneous affections arising from a common cause? they are not simultaneous affections, for the one always precedes the other. In by far the majority of cases in which both the lungs and digestive organs are affected, the affection of the digestive organs precedes that of the lungs. In some instances we find the affection of the lungs the primary disease. But in these, the case does not assume the form above described, but that of simple phthisis; and the hepatic affection, which is always the most prominent feature of this derangement in the digestive organs, does not shew itself till a late period of the disease, and then little if at all influences the essential symptoms.

We often observe the first of these forms of the disease arise from causes evidently acting on the digestive organs, and as far as we can perceive in no degree on the lungs, and the last from causes evidently acting on the lungs, and in no degree on the digestive organs.

It seems to be a necessary inference from the preceding facts, that a diseased state of either set of organs may produce that of the other. But the tendency of disease to spread from the digestive organs to the lungs is much greater, than that to

spread from the latter to the former. We often see a slight degree of derangement in the digestive organs produce cough and other pulmonary symptoms, and derangement seldom exists in all the digestive organs without producing more or less of these symptoms, whereas it is only after disease has advanced very far in the lungs, that it is apt to spread to the digestive organs, and in the greater number of instances it proves fatal without spreading to them.

When to these circumstances we add, that all the peculiarities of those cases of phthisis, which are from the commencement accompanied with disease of the digestive organs, may be easily explained by the existence of this disease; and that, as I shall presently have occasion to point out more at length, every thing which relieves this disease, at the same time relieves the pulmonary symptoms that attend it, the inference appears to be unavoidable, that in the species of phthisis which is the subject of this paper, the pulmonary disease arises from that of the digestive organs. It is not to be overlooked, however, that it is in those most disposed to pulmonary affection that disease of the digestive organs most frequently produces it. We consequently see this species of phthisis most apt to occur in the same habit which disposes to other forms of that disease. On the other hand, when the digestive organs are naturally weak, or powerful causes of disease in them have existed, particu-

larly the free use of spirituous liquors, we often see it occurring in habits apparently least disposed to pulmonary affection.

It will place in a clearer light what has been said of the nature of the disease before us, to take a cursory view of the sympathy which exists between the state of the digestive organs, and the principal seat of derangement in some other diseases. Let me here refer to a work, which no physician, whatever may be the extent of his experience and the accuracy of his observation, can peruse without advantage, although the modesty of its author has induced him to address it only to those belonging to his own branch of the profession, I mean the work of Mr. Abernethy, entitled "*Surgical observations on the constitutional origin and treatment of local diseases.*" I believe that experience has led many others to similar views, but no other person has laid them before the public in the way in which Mr. Abernethy has done, and those physicians whose attention has been directed the same way must be happy to see in Mr. Abernethy's work, a confirmation of their own observations; and such a confirmation as they were not likely to receive from the work of a physician. The physician's attention is directed to internal disease; there his inquiries naturally begin. Mr. Abernethy's, for a similar reason, began with external disease, and I believe every physician circumstanced as I was, will feel as I felt on reading

his work. I unexpectedly met him on a road where I did not expect to meet a surgeon, but where the assistance of a surgeon was of greater consequence to me than that of any physician could have been. From local, he was unavoidably carrying on his observations to general diseases. The sympathies in question so connect them that it was impossible for him to do otherwise. From general, I was, for the same reason, carrying mine on to local diseases. In the case of dyspeptic phthisis which Mr. Abernethy relates, the reader will find the principle of the treatment which I have employed in phthisis for more than twelve years, as many medical men of this neighbourhood have witnessed, and the following cases which occurred to me before I read his work, or was acquainted with his opinions, and which I shall relate as concisely as I can, will afford a confirmation of these opinions and of the practice founded on them in local diseases. I mention these cases, because like Mr. Abernethy's case of phthisis, they tend to confirm the accuracy both of his observations and mine, for surely no stronger confirmation can be required of any opinion, than two observers wholly unconnected, setting out from the most opposite quarters, and meeting in the same point. My plans of practice are not precisely the same as Mr. Abernethy's, and in particular the mode of giving mercury in internal disease, which I have found most successful, is different from his, but the general principle is the same.

A gentleman consulted me for severe pains in the legs, for which he had been treated unsuccessfully for two years. There was no reason to suspect syphilitic affection. I found his digestive organs deranged, and the epigastric region tender on pressure. He took a grain of blue pill combined with stomachic, and opening medicines three or four times a day; and was cured in a few weeks. A gentleman had sores continually breaking out on various parts of the body which had proved very obstinate, for which he had been advised to go through a regular course of mercury. The digestion was deranged, and the epigastrium tender. I dissuaded him from any thing like a regular course of mercury. He took stomachic and opening medicines, with a grain of calomel every second or third night, and was cured in about a fortnight. A lady after repeated attacks of illness remained very weak; glandular swellings appeared in different parts of the body, and it was feared that a general breaking up of the constitution was about to take place. The appetite failed, the bowels were disordered, and the epigastrium was tender. She took sometimes a grain of blue pill two or three times a day, with stomachic and opening medicines, and at other times either a few grains of blue pill, or one grain of calomel, according to the state of the bowels every second or third night; no application being made to the glandular swellings, but occasionally two or three leeches when they were tender on pressure. In about three

months her complaints disappeared under this plan of treatment, nothing but a depression of spirits remaining, which was removed by change of air.

In one respect Mr. Abernethy's mode of giving mercury in the cases above alluded to, and that to which I have been led in internal disease, arising from the sympathy of other parts with the digestive organs agree. It is from small and undebilitating quantities that good effects are to be expected; in such cases, given otherwise it debilitates the digestive organs, and often thus increases the disease. The chief difference in our modes of giving it is, that he gives large doses at long intervals, I give minute doses at short intervals. This difference has probably arisen from the nature of the diseases in which we have chiefly practised. Since I became acquainted with Mr. Abernethy's plan, I have tried it in internal disease, but have not found it so successful as that which I have been accustomed to pursue. Of the comparative effects of these plans in local diseases, I have not had sufficient opportunities of judging; and Mr. Abernethy does not mention his having tried the plan which I shall presently have occasion more particularly to lay before the reader.

Mr. Abernethy mentions other internal diseases, particularly those of the head and heart, caused by the deranged state of the digestive organs. I have repeatedly seen his observations on those diseases

confirmed, and could relate several cases in which the patient had for years laboured under symptoms of *angina pectoris*, and had been treated for this disease, in which the symptoms yielded in a few weeks to small doses of blue pill combined with stomachic and opening medicines. In such cases we must of course suppose, that no organic disease of the heart had yet supervened. His observations on the brain are well illustrated by two excellent treatises lately published by Dr. Cheyne *, and Dr. Yeates†, on the disease which has been called hydrocephalus internus. It seems surprising that the immediate connection of this disease with the state of the digestive organs should so long have escaped physicians.

It is not meant that hydrencephalus, as Dr. Smith ‡ more correctly terms it, always arises from affections of these organs. In many instances it evidently arises from causes acting on the brain itself; but were I to speak from my own experience, I should say, that in at least five cases out of six it arises from the former cause, and that, in all cases, preserving a proper state of the digestive

* A second Essay on Hydrocephalus Acutus or Dropsy in the Brain, by J. Cheyne, M.D. &c. Dublin, 1815.

† A statement of the early symptoms which lead to the disease termed water in the brain, &c. in a letter to Martin Wall, Esq. M.D. &c. by G. D. Yeates, M.D. &c. London, 1815.

‡ A treatise on hydrencephalus or dropsy of the brain, by J. C. Smith, M.D. &c. London, 1814.

organs is the best means of prevention; for even where it arises from other causes, their tendency to produce it will be greater or less according to the state of these organs.

The effects of the sympathy which exists between different parts of the animal body in the production of disease, does not seem to have obtained the attention it deserves. It is well known that nervous affections will, if I may use the expression, mimic the symptoms of almost every disease, but it does not seem to be generally admitted, although I think we have sufficient proof of the fact, that if this mimic disease is kept up for a certain length of time it will be converted into the real disease, let the cause which produced it be what it may. I cannot chuse a more striking instance to illustrate this observation, than one intimately connected with the form of phthisis which we are considering.

In the 43d, 44th, and 45th sections of Morgagni's 21st epistle, the reader will find the pleuritis verminosa treated of at some length. He mentions one case in which all the symptoms of pleurisy were well marked, that terminated favourably by a bloody vomiting which brought up a lumbricus. We might in this instance attribute the relief obtained rather to the loss of blood than the expulsion of the worm; but he refers to a paper of Pedratto on the pleuritis verminosa, where the relief obtained by the expulsion of worms from the

stomach and intestines, particularly from the former is unequivocally proved. It there appears that all who vomited the worms or passed them by stool recovered, while those who did not, died. All the common means of treatment in pneumonia failed, anthelmintics alone were successful. While the expulsion of worms from the *primæ viæ* immediately removed the disease, it is impossible for us to believe that real inflammation of the lungs had existed, yet in those in whom the disease proved fatal, the same appearances were found in the thoracic viscera, as in those who die of other forms of pneumonia. Thus disordered digestion produces palpitation and syncope, and if these symptoms continue to recur for a great length of time; they end in real disease of the heart. Thus the same cause produces drowsiness and inability, which if long continued, ends in real disease of the brain. They produce cough and dyspnœa, and if long continued, real disease of the lungs. In all these and many similar instances, no real disease seems at first to exist in the parts sympathetically affected. We must suppose, however, that some degree of debility or aptitude to disease exists in them, which determines the sympathy to affect them, in preference to other parts, with which the part originally affected equally sympathises; or there may be something in the original affection, which we cannot trace, that determines it to sympathise more with one part than another.

We see the same law obtaining in every instance: when affections of the liver produce pain in the shoulder, there is no disease in this part; the pain is merely sympathetic, we may press and rub the shoulder, the patient feels no more uneasiness from it than he would in the other shoulder; but after the pain has continued for a considerable time, the shoulder itself becomes affected. The patient cannot bear to have it pressed, and sometimes cannot lie upon it. When inflammation spreads from the intercostal muscles to the lungs, it does not traverse the pleura, reaching the lungs by the fold which reflects this membrane over them; it passes at-once from the pleura of the ribs to that of the lungs, between which there is no direct communication either of vessels or nerves, for this often happens previous to any adhesion having taken place. Why is inflammation of the bowels as apt to spread to the contiguous bowels, with which they have no immediate connection, as to those parts which are in continuation with the diseased part? why does loss of blood by the application of a few leeches to the skin over an inflamed viscus, often give more relief than the loss of many times as much blood from a distant part? why does the skin over diseased viscera, even when no adhesions have taken place, frequently change its colour, especially as death approaches, as I have often witnessed? why do eruptions of the skin, often very slight, alternate with serious diseases of

internal parts? it is needless to multiply such instances; whoever observes with attention the phenomena of disease will find them numberless. They are all referable to one law, by which neighbouring parts always, and distant parts often sympathise, independently of any direct communication either of nerves or vessels.

How we are to account for this sympathy I shall not here inquire. It teaches us an important lesson in the prevention of disease, that the first beginnings of many sympathetic affections, deemed trivial, should be watched with care. The headach frequently occurring from disordered stomach may at length become a disease of the head itself, and there is no viscus, we have reason to believe, in which disease may not arise in the same way. It teaches us a lesson of equal importance in the treatment of diseases, to make ourselves minutely acquainted with their history, in order to ascertain, if possible, whether sympathy with other parts had contributed to produce disease in the parts now most prominently affected; for if this be the case, and the affection of the former still continue, we shall attempt in vain to restore health by means directed only to the seat of the prominent disease. In this way, we have reason to believe many cases are allowed to prove fatal, for which a remedy may be found if we trace them to their source. The most remarkable instance of this kind which has

occurred to me is the dyspeptic phthisis, on the treatment of which, I am now to offer the remarks which a long attention to it has suggested.

Of the treatment of dyspeptic phthisis.

In speaking of the treatment of this form of phthisis, I shall follow the same plan which was adopted in speaking of its symptoms, confining myself to those circumstances in which it differs from the other species of phthisis.

As it appears both from the symptoms and causes of dyspeptic phthisis, that the affection of the lungs is influenced by the state of the digestive organs, it is reasonable to suppose that the means which tend to improve their functions will here be a useful auxiliary to those usually employed in phthisis. In the dyspeptic we always perceive sooner or later some fulness and tenderness of the epigastric region. It is after these have supervened that disorder of the digestive organs is apt to affect the lungs; and it is in proportion as we relieve them, that we find the affection of the lungs relieved. This fulness and tenderness which we have found the best diagnostic of dyspeptic phthisis, appears from dissection to arise chiefly from an affection of the liver, and the degree of these symptoms is generally a pretty correct measure of its degree.

This species of phthisis may be divided into three

stages, in which the prognosis and mode of treatment are different. In the first, the affection of the lungs is merely sympathetic, so that when the cause which produces it is removed, it ceases of course. This stage is distinguished by the short time which the disease has lasted, by the general mildness of the symptoms *, the fever in particular being very slight, and by there generally being no expectoration but what the cough itself seems to occasion, consisting of a colourless phlegm, and for the most part in small quantity. Sometimes what is expectorated is in masses of a tough glairy appearance, and of a blackish hue as if mixed with a small portion of carbon, which seem to have lain some time in the lungs, the expectoration of which relieves the cough, which in this case is seldom very troublesome. This last appearance of the expectorated matter generally indicates the very mildest form of the disease; it is when there is no expectoration, or when it is thin, scanty and difficult, that the disease is most apt to degenerate into the more alarming forms.

In the second stage of dyspeptic phthisis the continuance of the sympathetic affection has produced actual disease in the lungs. There are two ways in which this disease indicates itself. The

* I do not here speak of active inflammation of the liver which also produces cough and dyspnœa, and whose phenomena further illustrate the sympathy of which I have had occasion to say so much.

most frequent is by some degree of inflammation supervening on the surface of some part of the bronchiæ or air cells, in consequence of which the expectorated matter begins to be mixed with small portions of a pus-like substance, which gradually increases as the inflammation extends, till the quantity we have seen is often astonishingly great. Sir Everard Home, in a treatise on the properties of pus, has shewn how readily irritation of secreting surfaces produces it, independently of any breach of substance. Less frequently small vessels now and then give way, which prevents the inflammatory action, so that the expectorated matter presents no degree of the purulent appearance, but is occasionally mixed with blood. The symptoms now assume a more formidable character, the tendency to fever in particular is greater; but it seldom completely puts on the form of hectic. In this stage there is either no breach of substance in the lungs, or the little vessels which from time to time give way, soon heal. It seems to be at this period that tubercles generally form. These going on to suppuration and ulceration, or the irritated surface of the bronchiæ and air-cells becoming ulcerated, the last stage commences, in which dyspeptic phthisis is nearly as fatal as any other form of the disease.

This stage is indicated by the aggravation of all the symptoms, particularly by the fever assuming more perfectly the form of hectic, and the expec-

torated matter occasionally containing both a pus-like matter and blood. It often happens however, especially where there has been no expectoration of blood at an early period, that no blood is ever expectorated. In this last stage the expectorated matter occasionally assumes all the various appearances observed in the last stage of other cases of phthisis.

In the first of the above stages the disease generally yields readily, except the dyspeptic symptoms are peculiarly obstinate (in which case some degree of them has generally been of long standing, or the patient has suffered from former attacks of the disease), or there is such a tendency to a tubercular state of the lungs, that the hepatic affection which I have had occasion to observe always shews itself before dyspepsia produces phthisis, and this state of the lungs occur almost at the same time. Such appear to me to be the chief circumstances which sometimes render the disease fatal even when properly treated at this early period; but so generally successful is a proper treatment at this period, that it required many years' observation to convince me that it will not always succeed, and to satisfy my mind respecting the causes of its failure. The last of the causes just mentioned I am convinced is the most frequent of them. It is evident that when the tendency to tubercles of the lungs is so great, the case is pretty much of the same nature with that form of phthisis

which originates in the lungs, whose fatal tendency no mode of treatment, however early adopted, will always prevent.

It always adds much to the unfavourable prognosis to find that the patient has scrophulous enlargement of the more external glands, which is often such as cannot be seen, but only felt. It will be generally admitted, I believe, that external glandular swellings and suppurations often tend to prevent internal disease. We see in the same family, some fall a sacrifice to phthisis, while others, labouring under these swellings, escape it. I have seen a person in the last stage of phthisis saved by the glands of the neck suddenly swelling and suppurating. But that slight enlargement of the external glands which may be rather felt than seen, while it indicates, is not of sufficient importance to obviate the tendency to internal disease.

Provided there is no great tendency to tubercles, and the hepatic affection is not unusually obstinate, the first stage of hepatic phthisis generally yields to the usual means of relieving the cough and tendency to fever, combined with such an attention to diet as prevents the stomach being oppressed, keeping up a freer action of the bowels than is necessary in health, and taking care by occasional doses of blue pill or calomel, according as the bowels are more or less easily acted on, to preserve a sufficiently copious and healthy secretion of bile.

I have generally given the mercurial, for the most part one grain of calomel combined with the compound extract of colocynth, every second or third night, desiring the patient not to go out the next day, till it shall have passed off, and if it does not pass off in a couple of hours after rising, to assist it by a moderate dose of Epsom salts. In addition to these means stomachic medicines were generally used, particularly when the appetite was much impaired.

All of this class of medicines which possess any heating quality have appeared objectionable. Even gentian, so useful in the cases mentioned by Mr. Abernethy, seems often to increase the cough and the tenderness of the epigastrium. I have found extract of camomile flowers, combined with small quantities of the powder or oil of carraway among the best stomachics in such cases; and unless the strength be much reduced, Epsom salts have appeared to be the best assistant to the cathartic effects of the mercurial. The latter I have given, not for the purpose of moving the bowels, but improving the state of the bile, and therefore only in very small doses. I have seldom seen much advantage arise from giving more than one grain of calomel. There is the strongest objection in all diseases tending to phthisis to debilitating doses of any medicine.

The second stage of dyspeptic phthisis requires

a plan of treatment essentially different from the foregoing. When the disease has been neglected till this stage commences, which is very frequently the case, or we find that notwithstanding the employment of the above means, the sputa begin to assume a purulent appearance, or to be mixed with blood, the tenderness of the epigastrium continuing, and an unhealthy secretion of bile constantly recurring, we may be assured that the foregoing means will be ineffectual; and that if time be lost with them till the third stage supervenes, life will be sacrificed.

The following is the plan which, under such circumstances, I have for the last nine or ten years adopted, and the efficacy of which has induced me to offer these observations to the attention of the public. Either laying aside or continuing the occasional grain of calomel as the state of the bowels seems to require, I have given one grain of the blue pill combined with some mild stomachic, two or three times in the course of twenty-four hours, continuing it either till the tenderness of the epigastric region yielded, and a proper secretion of bile was restored, or the gums appeared a little redder and fuller than natural.

As the tenderness of the epigastrium abates, and the fæces assume the natural appearance, in by far the majority of cases the pulmonary symptoms

gradually disappear. It has been said by many who have seen my practice, that little is to be expected from such minute doses, but I have found the gradual effect produced by such doses on the whole much more beneficial, than the more sudden effects resulting from larger ones, which often induce a degree of debility that more than compensates for the advantage obtained from them. There are no other circumstances perhaps, under which mercury is given, where it is of so much consequence to support the strength. The evident advantage of this in all cases of phthisis is such, as to have induced some to adopt the tonic plan in defiance of every counterindication; by which I have often, particularly in this species of phthisis, which bears tonics worse than that which originates in the lungs, seen those who, there was reason to believe, might have recovered, lost; and those whose illness might have been long protracted, suddenly destroyed.

With the foregoing, I have always combined local means for the purpose of relieving the tenderness of the epigastrium. If it be not considerable, a succession of small blisters applied over the part is sufficient. If it be so, the blisters should be preceded by the loss of from two to four ounces of blood from the part, from which practice, if the pulse be hard, although the tenderness be not considerable, great advantage often arises. When

the disease is obstinate or has repeatedly recurred, a permanent discharge from this part, especially that by a seton, is often highly beneficial.

By such local measures the quantity of mercury required is much lessened. If the tenderness be very great indeed, no quantity will succeed without such means as more directly reduce the inflammatory action.

For the purpose of lessening the quantity of mercury, I have also combined with it such other means as tend to promote a regular and healthy secretion of bile. From this tendency of small doses of Epsom salts, they are preferable to other cathartics, provided they are equally suitable in other respects; but of all the means which I have employed with this view, I have found none equal to the dandelion. It ought always perhaps to be given in some form or other in dyspeptic phthisis. But it unfortunately tends to oppress the stomach, and can often on this account be given only in small doses, in which it is of little use. It is always proper to combine it with such bitters and aromatics as suit the case. When the stomach bears it well, so that the patient can take a decoction of it poured upon camomile flowers for his common drink, or what I have found better, two or three table-spoonsful of the fresh expressed juice in camomile tea, three times a day, its beneficial effects are frequently very striking. Advantage often

arises from infusing a few cloves with the camomile flowers. When the dandelion can be given in the above ways, I often give only half a grain of the blue pill three times a day, and I think generally find as much advantage from it as from a whole grain without the dandelion. Many, I know, will regard the exhibition of such minute doses of mercury as little better than trifling; if however they make a patient trial of them they will, I am persuaded, alter their opinion.

All purgatives seem to have more or less the effect of promoting a due flow of bile as well as of the other secretions poured into the bowels, and to this I would chiefly ascribe the great advantage derived from them in so many diseases, respecting which we have received so much practical information from Dr. Hamilton's invaluable work on purgatives.

If neither the tenderness of the epigastrium be removed, nor the gums a little affected by the above plan in about a fortnight, I have gradually increased the quantity of the blue pill till one of these effects took place. If either take place without relieving the pulmonary symptoms, the prognosis is bad. If the tenderness of the epigastrium continue, the hepatic affection is unusually obstinate; if this be wholly removed without materially relieving the pulmonary symptoms, we have reason to believe that the disease has made great progress in the

lungs. It is surprising from what states the lungs will sometimes recover when relieved from the irritation of the hepatic affection. I have seen many recover, not only whose friends, but whose physicians had lost hope of them. But in these cases, the proper means had not been tried; if these have failed, the hope is no better than in other species of phthisis.

Where the failure of relief proceeds from the obstinacy of the hepatic affection, some hope arises from a fuller mercurial course, but this hope is often fallacious; for although such an alterative plan as I have recommended may be pursued without any diminution of strength, and is generally, by relieving the disease, attended with an improvement of it; a course that greatly affects the mouth, although powerful in relieving the hepatic affection, produces a most unfavourable impression on the pulmonary system by the debility it occasions. In such a case, however, it must with caution be tried, the only alternative being a certainly fatal termination.

I may here observe, nothing indeed is more evident, than that the quantity of mercury applied to the bowels, or to the skin, is a most fallacious measure of the quantity which the patient actually receives. To the skin in particular in this disease from the languid state of its absorbents, a great deal may be applied and hardly any received by

the system. I have often seen the patient much exhausted by the rubbing, and yet, as appeared from the state of the mouth, receiving very little of the medicine. Sometimes when the patient bears it well, the exercise of rubbing seems beneficial, so little mercury is often received by the skin in phthisis, that I have sometimes thought this the only advantage the patient derived from the rubbing. In other cases it enters more readily. But independently of this objection, I have found the application of mercury to the skin much less beneficial than to the stomach and bowels in this disease, no doubt from its local effect on these organs and the biliary system being less perfect, so that I have of late seldom prescribed it by the skin, except when its internal use irritated the bowels, an effect which is generally prevented by the mild anodynes that are otherwise proper in almost all forms of phthisis. It is not uncommon in this disease to find the whole absorbent system so languid, that little mercury is received, even when it is given internally. It is almost needless to add, that its good, as well as its bad effects, if we except mere irritation of the bowels, depend on the quantity which the system receives.

It sometimes happens that the tenderness of the epigastrium is wholly, but the pulmonary symptoms only partially relieved by the above plan. In this case the hepatic affection is apt to recur, always bringing with it an increase of the pulmo-

nary symptoms, till the structure of the lungs is at length destroyed. Here, if the recurrence of the hepatic affection be neglected, the fatal termination is rapid. If it be carefully watched and relieved as it appears, the case is protracted, and the decline of the patient gradual. I have known cases where the progress of the disease had by such means been so retarded, that there was little increase in it, in the space of several months, prove rapidly fatal on the adoption of another plan, in consequence of the patient's coming under the care of medical men who were not aware of the history of the case. In such cases I have already had occasion to observe, the neglected hepatic affection, towards the fatal termination, sometimes produces dropsy of the belly. Under any plan of treatment these cases generally prove fatal at last, and the only chance of success is afforded by constantly watching and removing the first recurrence of hepatic affection. It is necessary to have been in the habit of watching for it, to be able to distinguish such degrees of it as are often capable of greatly injuring lungs already diseased. Although the tenderness be very uniformly in the epigastrium, sometimes though rarely its chief seat is in the right side.

But the most fatal case is when the hepatic affection finally disappears, the seat of the disease being wholly transferred to the lungs, as happens frequently in the last stage of this species of phthisis.

In this case there is no hope; while the hepatic affection continues to recur, there is always some hope, however small, that on its final removal, the lungs may recover themselves.

With respect to the parts of the treatment which are common to dyspeptic and other forms of phthisis, I have little to offer as peculiar to the former. I think I have found a combination of the extracts of white poppy and conium, the best anodyne in this form of the disease. Opium is more inclined to constipate the bowels and retard the due flow of bile, and the anodyne power of the hyoscyamus in such doses as are safe, is not to be depended on. When the epigastrium is very tender, animal food and fomented liquors are peculiarly injurious. Of cathartics I have already spoken.

Some suppose that mercury is often useful in other forms of phthisis. I have never found it so, but I think, when I have been obliged to employ it on account of other diseases being complicated with them always hurtful. I have remarked that in these forms of the disease it never seems to improve the strength, as it generally does in dyspeptic phthisis, by improving the digestion. In them the digestion is generally good, and we have nothing to compensate for the debilitating effects of the mercury.

If there be any case of idiopathic phthisis in which mercury is proper, it is one which I have already had occasion to mention, in which the pulmonary disease produces disease of the digestive organs, of which we still find hepatic affection the prominent feature, and which always tends to aggravate the original disease. I have not however found it useful in such cases, which I think may be easily explained. In them the pulmonary affection is far advanced before the affection of the digestive organs appears, and both on this account and because the former is the original disease, it cannot be removed by removing the latter. Besides it is not likely that small doses of mercury will ever remove the hepatic disease, while the cause which produced it still continues to operate; and large doses, if they are capable of removing it, are here out of the question.

An alterative plan, conducted in the way above pointed out, I have found equally serviceable in what are called nervous diseases, when they arise, as frequently happens, from the above state of the digestive organs. Thus habitual depression of spirits, headache, palpitation and many other complaints of the same description may be relieved.

Worcester, June 18, 1816.

CASE

OF

INGUINAL ANEURISM,

CURED BY TYING THE EXTERNAL ILIAC ARTERY.

BY JOHN SMITH SODEN, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON;
SURGEON TO THE CITY INFIRMARY AND DISPENSARY;
TO THE EYE INFIRMARY;
AND TO THE PENITENTIARY AND LOCK HOSPITAL, BATH.

COMMUNICATED BY

MR. HODGSON.

Read June 25, 1816.

THOMAS Gater, an active muscular man, of a spare habit of body, and 56 years of age, was admitted into the Bath City Infirmary, on Saturday April 20th, 1816. His occupation of a smith has required at times great exertion, and his employment at the forge has exposed him to sudden changes of temperature. In October last, in fixing an iron roof over a large oven, he twisted his right knee, and in consequence of this strain, he was lame about a week. After this accident he frequently felt pains in the right groin, but they did

not particularly attract his notice, as he attributed them to rheumatism. About the end of January, he was attacked suddenly with a slight paralytic affection. He had difficulty in articulating, and could not write correctly what he wished to express. He was confined to his bed about a week, but recovered by means of venæsection, purgatives, and low diet. During his confinement he had very acute pain in the right thigh and groin, different from the pain which he had before experienced, and he discovered a pulsating tumour in the groin about the size of a pigeon's egg. He resumed his business but was lame, and suffered constant pain in the tumour, which gradually became larger. About the middle of March, after considerable exertion, the whole limb began to swell, the tumour increased very much, and its pulsation was so violent that he thought it lifted his whole body. From this period the progress of the disease has been alarmingly rapid.

The thigh and leg are enlarged to twice their natural diameter. The tumour is extremely painful, and projects above the general swelling of the limb, about the size of a large lemon. It reaches above Poupart's ligament, and extends about three inches down the thigh. It can be emptied by pressure, but is distended again immediately the pressure is removed. The nature of the disease is obvious both to the sight and touch.

This patient was admitted under the care of my friend Mr. Cruttwell; but as he had unfortunately been obliged, on account of ill health, to retire for a time from professional duties, the case devolved upon me.

I enjoined rest, venæsection and an aperient; and advised that the operation should not long be delayed. The man consented, and on Monday the 22nd, at eleven o'clock, I tied the external iliac artery, in the presence of Mr. White, Mr. Norman and several other professional friends. I performed the operation according to the mode recommended by Mr. Abernethy, except that I used only one ligature, very thin, and of silk. The pulsation in the tumour ceased immediately after the ligature was secured; and, as soon as the patient was in bed, he said, "Sir, my pain is gone, I am quite easy."

He was comfortable the whole of the day, and had a tolerable night; but the next day (23rd), symptoms of peritoneal inflammation came on, and it was necessary to have recourse to the lancet.

On the 25th, he was free from fever, and no untoward symptom subsequently occurred.

The heat of the aneurismal limb, two hours after the operation, was three degrees higher than in the

sound limb. The next day the temperature was equal on both sides. On the 25th, the aneurismal limb was one degree colder than the other, and this was the greatest difference observed in the temperature of the limbs at any subsequent period during the cure.

The ligature was detached on the 8th of May. The upper part of the wound was well in a month; but a small portion about the size of a sixpence, at the lower part, was slow in healing, and did not completely cicatrize till about seven weeks from the date of the operation.

The contents of the tumour were absorbed. The swelling of the limb subsided. A month after the operation, the limb was reduced to its natural size. No tumour projected above the surface, but a hardness about the bulk of a walnut could be felt in the groin, and upper part of the thigh. This hardness gradually diminished, and the patient was discharged cured on the 15th of June.

The external iliac artery has been tied so frequently in this country, and the success of the operation is so fully proved by the cases recorded by my friend Mr. Hodgson in his valuable work on the diseases of arteries, that a detail of the daily proceedings in the above case would have been tedious and uninteresting; but, as the operation must be regarded as one of the most formidable

which a surgeon is likely to be called upon to perform, and as a degree of scepticism is said still to prevail in France, respecting the successful treatment of aneurism by English surgeons; it is perhaps essential to the general establishment of the operation, that at present the result of every case of this description should be communicated to the public. I have therefore thought it probable that the foregoing brief history might not be unacceptable to the Society.

FACTS

ILLUSTRATING THE

EFFECTS OF THE VENEREAL DISEASE

ON THE

FŒTUS IN UTERO,

AND THE

MODES OF ITS COMMUNICATION.

BY WILLIAM HEY, Esq. F.R.S. &c. &c.

OF LEEDS.

COMMUNICATED IN A LETTER TO

JOHN PEARSON, Esq. F.R.S. &c. &c.

Read June 25, 1816.

Leeds, April 8, 1816.

DEAR SIR,

HAVING been engaged in the practice of midwifery during fifty-seven years, many opportunities have been afforded me of seeing the effects of the venereal disease upon the fœtus in utero, as manifested in the earliest infancy of children; and, at your request, I sit down to communicate some observations which I have made upon this subject.

I shall first describe that disease in the infantile state which I consider to be the lues venerea, or syphilis; and then take notice of the different modes by which it may be communicated to the fœtus in utero.

I cannot better describe the disease in question, than by relating to you the last case which has occurred in my practice. A poor woman, the wife of a soldier, brought to my surgery, a few weeks ago, her child, an infant betwixt two and three months of age. This child, without any disorder in its bowels, had become extremely fretful; its voice was grown stridulous. It had upon its chin a scaly eruption, extending to the angles of the lips; and its body was covered with copper-coloured spots. My inquiries of the woman respecting her own health, satisfied me that she had had the venereal disease, from which I apprehended she was not then entirely free. I directed half a grain of submuriate of mercury, with a few grains of pulv. tragac. comp., to be given to the child twice a day, and requested to see it again when the medicine should have been taken seven or eight days. The woman returned at the time appointed, and shewed me her infant much improved in health. Its fretfulness had ceased, and its voice could scarcely be called stridulous. The copper-coloured blotches were beginning to fade, and the eruption upon the chin was diminished. I advised the poor woman to persevere in the use of the medicine, till the dis-

ease should have entirely disappeared; but I did not see her again.

Here I would remark, that infants in general bear the use of mercurials, even in doses that will often affect adults, without any apparent disturbance of the animal functions. I generally direct the dose above-mentioned to infants within a year old, in such cases as I have described, without producing any salivation, which, as far as my experience extends, is seldom excited in infants. When the bowels are in a lax state, I either join a quarter or half a minim of tincture of opium to each dose of the submuriate of mercury; or give the hydrargyrus cum cretâ.

This disease is not unfrequently attended in infants with an extensive desquammation of the cuticle; and sometimes makes its first appearance in this form, when the affection has taken place in utero.

Several instances have occurred amongst my patients, where the mother having been once affected with the disease, has communicated it to two, three, or even four children in succession; each of them having the disease in a milder form than the preceding one: and this without any ground of suspicion, that the mother had received a fresh infection. This has happened in families where my attendance has been required in every

case of indisposition; and where I have had the opportunity of being acquainted with every circumstance that an assistance at the time of delivery could afford me.

This progressive communication of disease to the fœtus in utero has taken place, not only where the mother has received the infection in the ordinary way; but also where the organs of generation have remained unaffected both in the husband and wife.

In the latter end of the year 1770, and the beginning of 1771, a blind woman, who gained her living by drawing the breasts of women during their confinement, became affected with ulcers at the angles of the lips, which were judged to be venereal. I saw the ulcers, and thought them to be of that description. She had drawn the breasts of a woman who was supposed to be labouring under the venereal disease, and the ulcers did not heal till they were treated as in a case of syphilis. Several women, whose breasts were drawn by this poor woman, became infected in the manner which I shall now describe.

Mrs. B. had her breasts drawn twice by this woman, upon the death of her second child, which died of the small-pox, and within three or four weeks afterwards perceived a swelling of the axillary glands, and complained of soreness in her

throat. She consulted the late Mr. Billam, a judicious surgeon, who assured her that the disease affecting her throat was venereal, and treated it agreeably to that opinion. During this treatment she became pregnant; but continued the use of the medicines prescribed, till she arrived at the fifth month of her pregnancy. At the end of the seventh month she miscarried of a dead child. I attended her during labour, and perceived nothing amiss in the vagina or contiguous parts. She assured me that these parts had never been affected with disease, and that previously to this confinement she had borne three healthy children.

She became pregnant again in 1772; continued to enjoy good health; and was delivered on February 26th, 1773, of a child apparently healthy, which she herself suckled. When the child was about six weeks old, an eruption which I judged to be syphilitic, appeared upon its legs and arms. I immediately put both the mother and child upon a mercurial course, giving the former small doses of hydrar. submur., and the latter hydrar. cum cretâ. By this treatment the child was in a short time freed from the eruption; but continued to take the medicine till the beginning of August.

In October following, two or three small ulcers appeared on the outside of the labia pudendi of the child, and on this account the mercurial course was resumed, with the addition of an occasional

dose of hydrar. submurias. The ulcers were soon healed; but in May 1774, the nostrils became sore, and the integuments of the nose were also tender. At the same time the voice of the child grew hoarse; the mercurial course was repeated, and continued for two months. The child also took the medicines during part of the months of September and October; after which time there was no recurrence of disease.

In June 1775, Mrs. B. bore another child, which was apparently healthy at its birth, and continued to be so for a few weeks. Blotches of a copper colour then appeared upon the skin; but soon disappeared upon having recourse to the mercurial medicines. After some time* the blotches appeared again, and were accompanied with a small ulcer in the labium pudendi, as in the former case. The child was, however, completely cured by a repetition of the treatment, and remained well.

It is scarcely necessary to transcribe any more cases of this kind from my notes, or from recollection. I will only add, that one patient who had received the disease in the way last-mentioned, was so offended with my using the term *venereal*, that she put herself under the care of another surgeon, whose opinion, however, coincided with my own.

* The time is not specified in my notes; but it did not exceed a few months.

Four successive children which this woman bore, were affected in the same manner.

It has appeared to me from several instances, that a man may communicate the lues venerea, after all symptoms of the disease have been removed, and he is judged to be in perfect health.

A few years ago a gentleman requested to speak with me in private. He was no sooner seated in my study, than he burst into a flood of tears, and seemed to be in the greatest distress. As soon as he could regain his composure, he informed me, that he had married a lady whom he tenderly loved, and now feared that he had injured her by communicating the venereal disease, which he acknowledged to have had before marriage, but from which he believed himself to have been since that time perfectly free. I saw no reason to doubt the truth of his declaration.

I visited his lady, and found her labouring under a confirmed lues. The labia pudendi, and verge of the anus, were beset with irregular fissures and condylomata; a discharge of puriform matter also issued from the vagina. She was advanced to the seventh month of pregnancy; but before her delivery at the termination of the ninth month, the diseased parts were healed, as I had pursued a mercurial course with as much vigour as seemed prudent in her condition.

The child was at its full growth, and had no other morbid appearance than an universal desquammation of the cuticle. It continued well about a month, and then began to grow extremely fretful; though its evacuations indicated no disease in the primæ viæ. At the same time it began to have a hoarse squeaking voice, and soon exhibited a number of copper-coloured blotches upon the skin. A scaly eruption also appeared upon the chin; and the anus shewed an unnatural redness. I had no hesitation respecting the treatment, but immediately commenced the mercurial course described in the first case above-mentioned. The event was agreeable to my wishes, and the child soon got well.

Soon after the restoration of the child's health, the family removed to another part of the county. Within half a year after their departure from the neighbourhood of Leeds, I received a letter from the lady, informing me that the child's complaint had returned again, and requesting a prescription for the medicines which had before effected so speedy a cure. I complied with her request, and since that time have heard nothing from the family.

Should any doubt arise upon a perusal of these cases, whether I have given the proper name to the disease herein described, I would beg leave

to submit the following considerations to your judgment.

When the notice of syphiloid diseases was first laid before the public by Mr. Hunter, the chief force of his argumentation was derived from this consideration, that although the diseases had a considerable resemblance to syphilis, yet being cured without mercury, they were thereby proved to be of a different nature. Now if this reasoning is allowed to have validity, we may suppose the converse of it also to be valid. If the disease in question have the usual symptoms of syphilis, and will yield to no other remedy than mercury, we may fairly conclude that it is syphilitic. What is our design in giving distinct names to diseases, but that we may thereby be directed to select the appropriate remedy for their cure? If my patient obtain the desired benefit from my nomenclature, a defect in my theory may well be excused.

It may justly excite surprise, that the gentleman whose case I have last related, should have remained free from disease, when his wife was in the condition which I have described. I confess myself unable to account for this circumstance, without calling in the aid of a supposition which wants probability. I have related all that I know of the case, and must leave the solution of the difficulty to your better judgment.

As I do not mean to enter upon an examination of the distinctions which have of late years been made betwixt genuine syphilis and syphiloid diseases; I trust I shall not be considered as having, by the preceding observations, expressed any doubt of the accuracy of those distinctions. I rejoice to see the ardour and judgment with which every branch of medical science is now cultivated; and must ever rank myself amongst the pupils of those, who by their discoveries and successful labours, are daily diminishing the sufferings of mankind.

I remain, Dear Sir,
Yours faithfully,
WILLIAM HEY.

To JOHN PEARSON, Esq.

ON THE MEDICINAL PROPERTIES OF STRAMONIUM; WITH ILLUSTRATIVE CASES.

BY ALEXANDER MARCET, M.D. F.R.S.

PHYSICIAN TO GUY'S HOSPITAL.

Read June 25, 1816*.

HAVING seen within the last few months, several instances in which Stramonium, or the Thorn-apple†, taken internally in the form of extract, has appeared to relieve acute pains of various kinds, more effectually than any other narcotic

* It is scarcely necessary to observe that since the outline of this paper was read to the Society, several cases that have subsequently occurred, up to the middle of September, have been added to it.

† *Datura Stramonium* of Linnæus. An herbaceous plant, with a thick branched stalk, two or three feet high, large sinuated indented leaves, and long tubular white or purplish flowers succeeded by large, prickly, green, fleshy seed-vessels, which open at the end in four divisions, and disclose numerous black seeds. It flowers in July.

medicine; and the properties of this plant, as an internal medicine, not having, to my knowledge, been yet particularly investigated or described by any English medical writer, I have thought it my duty to submit to the Society the result of my observations on this subject.

The inhalation of the smoke of the Datura Stramonium for the relief of asthma, a practice introduced within these few years, is, I believe, in some instances attended with unquestionable benefit, and is frequently resorted to in that disease. Indeed this plant, which grows wild in this and many other countries, and is more especially met with in dunghills and among rubbish, is now cultivated in some English gardens for the purpose just mentioned. It is chopped into small pieces and smoked like tobacco; and though often ineffectual, it has acquired no inconsiderable repute among asthmatic persons*.

The effects of this plant as a poison, when taken internally, have long been noticed in medical works, both in this and other countries: amongst those of American writers in particular, several tracts are to be found on this subject†. In Europe, the

* An ointment prepared from the leaves of Stramonium, has also been found to give ease in external inflammation, and in hæmorrhoids.

† Vide *Samuel Cooper's inaugural dissertation on Stramonium*, 1797, published in *Caldwell's Selected medical Theses, Philadelphia* 1805; and *Bartram*, in *Transactions of the college of physician of Philadelphia, I.* 198, *&c.*

poisonous effects of Stramonium are also mentioned by many authors. Boerhaave, amongst others, seems to have been well acquainted with its deleterious effects; for it is stated upon his authority, that "some boys, who had eaten the seeds of Thorn-apples, were seized with giddiness, horrible imaginations, terrors and delirium, and those who did not soon vomit, died." And Dr. Woodville relates, on the authority of Dr. Haygarth, an instance in the town of Chester, in which several children who had swallowed some of the seeds of Stramonium, were seized with blindness and a kind of madness, biting, scratching, shrieking, laughing and crying, in a frightful manner *. It had been observed also, that these effects, when the quantity taken was but small, though still very peculiar, were not so formidable; and it is even mentioned by Kempfer and Prosper Alpinus, that the Turks and Indians, who are not allowed to drink wine, sometimes take Stramonium in minute doses, on account of its exhilarating property.

As a medicine, however, it is in the writings of modern German practitioners, that I find the earliest records of its effects; and although it obtained, many years ago, a place in the Edinburgh

* *Woodville's Medical Botany, II.* 339. Other instances of a similar kind are related in the *Edinb. Med. Comment.* Vol. V. 161.

Dispensatory, it was evidently rather upon the authority of German writers, than from the experience of British practitioners. Dr. Störck of Vienna was, I believe, the first who expressly wrote upon the medicinal effects of stramonium. So far back as the year 1762*, he published a tract on the virtues of this plant, from the expressed juice of which he prepared an extract, which he administered in the dose of from half a grain to one grain, three, four, or even six times a day. He tried it in cases of mania, epilepsy and convulsions. Dr. Wedenberg of Upsal†, and Dr. Odhelius of Stockholm, repeated these trials in the same class of diseases; and the aggregate result of their experiments, though in some instances successful, and shewing the remedy to be possessed of great powers, was certainly not upon the whole very favourable‡.

* *Tract. de Stramon. Vienna*, 1762.

† *Wedenberg de stramonii usu in morbis convulsivis.*

‡ Dr. Samuel Cooper, in the work above quoted, which did not come to my knowledge till after this paper had been prepared for the press, contains the fullest account of the deleterious effects of Stramonium that I have yet met with. His experiments were tried partly upon men in health, and partly upon animals; and afforded some curious results, several of which coincide with my own observation. He relates also a few trials, made by himself and others, of its medicinal effects. These, however, are but summarily noticed, and add but little to our information on this subject. The preparation of the plant which was commonly used in his experiments, was the leaves in powder; and the dose was from half a grain to four grains.

In these, and a few other trials by German practitioners, the mode of preparing the medicine was various. Störck, as I have just mentioned, made an extract from the plant; others used the powdered leaves, in the dose of from one to five grains. Sometimes also a decoction of the whole plant was employed. As to the largest dose administered, I find as much as 30 grains of the extract stated to have been given for a dose *. But from what I shall presently relate of the effects of this medicine, that statement will appear scarcely admissible.

In these early trials, the effects which were most commonly observed when the medicine was taken in sufficient doses, were vertigo, a sense of dryness and suffocation in the throat, and a peculiar affection of the eyes, sometimes attended with sleepiness, and even in some instances with a degree of delirium. Some writers † assert that it is apt to paralyse the iris and dilate the pupil, like the belladonna. Others mention the aperient tendency of this medicine; but none of those whose papers I have had an opportunity of consulting, ascribe to it any constant or distinct effects on the pulse; nor do they seem to have noticed what appears to me to be the principal, and by far the most pro-

* *Murray's Apparatus Medicaminum, I.* 458.

† *Dictionnaire d'Histoire Naturelle, art.* Stramonium.

mising property of Stramonium, namely, that of allaying some of the most obstinate and severe kinds of pain.

The only form in which I have tried the Stramonium, is that of extract; and all the specimens I have used, with but one exception, have been prepared by Mr. Hudson, an eminent chemist and druggist in the Hay Market, who has been so obliging as to favour me with the following account of his process, with permission to lay it before the Society.

"One pound of the *Seeds* of Stramonium, after being well bruised, are boiled with three gallons of water down to one gallon. The decoction is strained, and the seeds are again boiled, with one gallon more of water, to two quarts. This second decoction is strained, and being mixed with the former, the whole is allowed to stand for twelve hours. The liquor is then drawn off, free from fecula and oil, and evaporated to a proper consistence, the latter part of the evaporation being performed in a water bath. A considerable portion of oil is separated from the seeds by boiling, which is troublesome in the extract, if allowed to remain, and does not appear to add in any degree to its effect.

"The quantity of extract, yielded by one pound of seeds, is from one ounce and a half to two

ounces, being liable to some variation from the state and quality of the seeds.

"An analogous extract is obtained by a process exactly similar, by substituting the *whole plant* cut into small pieces, instead of the seeds; but in this case none of the oily matter above-mentioned appears. The proportion of extract, when prepared from the whole plant, has not been ascertained."

I have only to add to the above account, that, from the few comparative trials I have made of the two kinds of preparations, the extract obtained from the seeds has appeared to me considerably more active than that prepared from the whole plant; and the impression made upon my mind from these trials is, that the extract from the seeds is more certain in its effects than the other, and that one part of the former is at least equal in power to two parts of the latter. But though the one appears to be so much stronger than the other, I am not able to point out any other difference between the two preparations. The form of pills is that which I have always used; but it would not be difficult to dissolve, or at least diffuse, the extract in some appropriate menstruum, so as to enable the prescriber, if necessary, to divide this powerful medicine into very small doses, with a greater degree of convenience and accuracy than the form of pills generally permits.

As to the probability of the Stramonium proving sufficiently useful to be adopted in general practice, no body is more sensible than I am of the great caution with which the statements of one individual, however candid, or the evidence of a few cases, however carefully related, must be received in medicine. The subject, nevertheless, will perhaps be deemed worthy of further investigation, and the annexed cases will appear entitled to the more attention, when it is remarked that I have made a point of mentioning the unfavourable as well as the successful results, a practice which appears to me indispensable in medical writings, and to which I have uniformly adhered on former occasions*.

I do not by any means pretend to have yet acquired a competent knowledge of the properties of this medicine; but if I were called upon to express in a few words the general opinion which I feel inclined to form from the opportunities I have had of studying them, I should say that the most common effect of Stramonium when administered in appropriate doses†, in cases of chronic disease, attended with acute pain, is to lessen powerfully, and almost immediately, sensibility and pain; to occasion a sort of nervous shock which is

* See an Essay on the medicinal properties of the oxyd of Bismuth, in the 5th volume of the Memoirs of the Medical Society of London.

† I mean from $\frac{1}{8}$th to 1 grain, a dose which should not be exceeded till its effects have been ascertained.

frequently attended with a momentary affection of the head and eyes, with a degree of nausea, and with phænomena resembling those that are produced by intoxication; to excite in many instances nervous sensations, which are referred to the œsophagus, or bronchiæ, or fauces, and which sometimes amount to a sense of suffocation; to have rather a relaxing than an astringent effect upon the bowels; to have no marked influence upon the frequency of the pulse, though in a few instances it has appeared to render it somewhat slower; to produce but a transitory and inconsiderable dilatation of the iris and pupil; and to have but little immediate tendency to induce sleep, except from the state of comparative serenity and ease, which generally follows the symptoms I have just described.

In some instances, however, as will be seen on perusing the annexed cases, the beneficial effects are obtained without the patient experiencing any of the uneasy sensations above-mentioned; while in a few others, the unpleasant consequences of the medicine have been experienced without any subsequent benefit.

I think it right to state, before I detail the cases, the accidental manner in which my attention was first directed to this medicine. About 15 months ago, as I was one day visiting my patients in Guy's Hospital, one of the medical pupils, then

attending the hospital, (whose name I cannot recollect, else I should have great pleasure in mentioning it) informed me by the bed-side of a patient labouring under excruciating pain from sciatica, that his father, a practitioner in the country, was in the habit of preparing an extract of Stramonium, which he found singularly useful in relieving those painful disorders. This gentleman at the same time offered me a few grains of this extract which he had with him, and which I immediately tried in the case in question *, with the following result.

CASE I.

Jane Elsworth, æt. 30, was admitted into the hospital, on the 5th of April 1815, labouring under symptoms of Sciatica of long standing, with strong suspicion of disease in the hip-joint. The pains in the hip and knee were excruciating; and Cicuta, Hyoscyamus, Opium and blistering, were tried in succession without any relief, till the 13th of May, when $\frac{1}{2}$ grain of extract of Stramonium was given three times a day. The relief was immediate and very striking; but she uniformly complained, each time she swallowed the pill, of a pe-

* In all the other cases related in this paper, Mr. Hudson's extract was exclusively used.

culiar sensation of heat in her throat, with a kind of spasmodic affection in her breathing, which however always went off after a few minutes. This remedy was continued till the 27th of May, when finding herself free from pain, it was omitted; but the pain soon returned, though not so severe as before; and at the end of three days, the pills being again resorted to, the same striking beneficial effects were produced. On the 5th of June the pains were so much subdued, that she was discharged as cured, feeling quite able to return to the care of her family.

CASE II.

Peter Gahagan, æt. 30, became a patient in the hospital on the 27th of March 1816, complaining of acute pains in the loins and in the right hip, often shooting to the groin; and he stated that his complaints had begun four months before. He was cupped and blistered without any benefit. The warm bath, Guaiacum, and Opium were used without better success. On the 11th of May, $\frac{1}{4}$ of a grain of the extract of Stramonium prepared from the seeds, was ordered to be taken three times a day. The relief obtained by this was so immediate and so complete, that he was able to walk out, and actually quitted the hospital of his own accord on the 13th, that is, after having only taken

five or six doses of the medicine. Some time after this however, the sister of the ward was informed that he had relapsed.

CASE III.

The case I am going to relate, though it ultimately proved fatal, and did not indeed at any time admit of any reasonable hopes of cure, appears to me to afford a remarkable illustration of the powers of Stramonium in diminishing sensibility and pain. It occurred last spring, in private practice, in a lady of great respectability, and of a clear and cultivated mind, who gave a much more distinct and satisfactory account of her sensations than most persons are able to do under similar circumstances. The general outline of this case was as follows: Mrs. T. about 48 years of age, had for some years past been subject to a tumor in the right breast, which though evidently schirrous, and of a very large size, had never given her any considerable pain. The bulk of the breast however, and the tension of the skin had latterly become sufficiently troublesome to induce her to try, by the advice and under the management of Mr. John Pearson, the plan of treatment by bandages and pressure, as lately proposed by Mr. Young. This was persevered in for some months, and it was thought with advantage, the tumor

having been sensibly reduced in size, and having become less uneven at its surface.

In the course of the last winter, however, whilst under this treatment, the patient was suddenly seized with acute pains in her loins, which were first considered as rheumatic *; and three or four weeks after this, when apparently in a state of amendment, she was suddenly seized with what she called a crawling sensation in her left hip and thigh, extending down to the knee and leg, and occasionally shooting towards the groin and pubes. This sensation was almost immediately converted into pain of the most acute and excruciating kind, especially on attempting to move the affected parts; but without any distinct fever. Bleeding, blistering, opiates, Cicuta, Hyoscyamus, &c. were tried with great diligence, but with scarcely any sensible effect. Opium sometimes produced temporary relief, but it was used with great reserve on account of the obstinate state of costiveness it was found to induce. When the pain abated for a short interval, she often felt a numbness or tingling in the affected limb, and a great disinclination, if not a total disability, to move it. It was found necessary at this time to discontinue the application of bandages to the breast, on account of the exquisite pain it produced in the loins and thigh, by the unavoidable change of posture it occasioned.

* During the preceding winter this lady had experienced a slight attack of the same kind.

These symptoms had lasted about two months, during which she had constantly kept her bed, when I saw her for the first time, about the beginning of April last, in consultation with Mr. Pearson. It occurred to me that the Stramonium might afford some relief; and finding that Mr. Pearson had two or three times given that remedy with good effect, to patients labouring under severe pain, I proposed that we should give it a trial in this case. We accordingly ordered ¼ of a grain of the extract from the seeds, prepared by Mr. Hudson, to be taken three times a day, which dose was the next day increased to ½ of a grain three times a day. The result even from the first dose, was very remarkable. The patient felt, within a few minutes after taking the pill, a peculiar sensation in her throat, which, notwithstanding her usual accuracy in expressing her feelings, she was at a loss how to describe. She compared it to a current of wind rushing up and down the inside of her throat, and producing a slight sense of suffocation. In the course of about a quarter of an hour however, the pain subsided sensibly, and soon afterwards entirely, and an uncommon feeling of serenity and repose, though not sleepiness, was experienced. These effects were reproduced whenever she took the pill; but after a few doses, the recurrence of pain altogether ceased, so that at the end of four or five days the Stramonium was laid aside. About this time she suddenly won-

dered one morning that she had not passed any urine for 24 hours, and yet that she felt no call or uneasiness whatever. The catheter was immediately applied, and her urine drawn off without pain or inconvenience. On the following day her bowels being quite inert, she naturally connected this circumstance with the state of her bladder, and became exceedingly alarmed, under an idea that a mortification had taken place. By means of castor oil however, several motions were easily procured; but with very little if any control over the sphincters; and from this time no urine was ever discharged without the catheter, nor any motions obtained without the assistance of cathartics. About this period however, being refreshed by the absence of pain, her strength seemed for a time to recruit itself, and she recovered a considerable degree of appetite and cheerfulness; but she never again ventured to sit up in bed, partly from a sense of weakness in the loins, and partly from the dread of the pain which a change of posture might have brought on. She got so much better however, that the operation of strapping the breast was resumed; but it was soon found necessary to leave it off again on account of the fatigue it occasioned.

The further details of this interesting and melancholy case, and the various conjectures and speculations to which it gave rise, would be irrelevant to my present purpose. It will suffice to

add that the paralytic symptoms above described did not in any degree abate, and that the strength of the patient continued gradually to decline, though the pain did not in any degree return. About the middle of June, she was carried in a litter into the country a few miles from town; and this removal, after her long confinement, far from giving her pain, afforded her exquisite enjoyment. Soon after this however, some gangrenous spots in the sacrum, which had been observed for some time, became highly inflamed and painful; her powers of digestion were more and more reduced, the prostration of strength became excessive, though the mind continued unimpaired, and on the 15th of July, death terminated her complicated sufferings.

CASE IV.

Sarah Mears, aged 23. This is a case which has for some years, at different periods, excited great interest in Guy's Hospital, and given rise amongst the physicians and pupils to much controversy and discussion. The particulars of this young woman's long and problematic sufferings, will probably some day be made public, but would not be relevant to my present purpose. The following short outline of the case however, will be

necessary to convey an idea of the effect of the remedy, the properties of which I have been endeavouring to ascertain.

The original symptoms were, so far back as five or six years ago, a tumor in the abdomen first inclining towards the left side, but afterwards occupying the whole abdominal region, occasioning in its progress exquisite pain with fever and extreme irritation, and yet not producing emaciation, and not permanently impairing the powers of the constitution, or disturbing the visceral functions This tumor gradually increased to an enormous size, so as greatly to exceed that of a woman in the ninth month of pregnancy, and the pain became more and more intense, till at last enormous quantities of a sanious or puriform fluid, mixed with blood and serum, were simultaneously discharged, partly by vomiting, and partly by the vagina and the rectum, and the patient soon recovered. In the course of a few months however, the complaint gradually returned with similar symptoms, which were again relieved in the same manner, and the tumor has now, for the 11th time, gone through the process of filling and bursting, with extreme pain and subsequent sudden relief, in the way I have just described.

It was on this last occasion, on the 10th of April, during the formation of the tumor, the pain being at its highest pitch, and Opium affording but

little relief, though given in the dose of from six to ten grains, that the Stramonium was tried in the dose of only half a grain, three times a day. This remedy uniformly produced, about a quarter of an hour after being taken, some giddiness and dimness of sight which lasted a few minutes; but the pain was immediately allayed for a few hours; and the same relief was experienced whenever the pill was repeated. But after continuing the Stramonium for five days, the contents of the tumor having been spontaneously discharged in the usual mode, and a truce to the pain having taken place, as on former occasions, the extract was discontinued. This time however, the cyst was not allowed to fill again; but on the contrary, the moment that the symptoms of throbbing and fulness recurred, the accumulating fluid was forced out by external pressure, and discharged both by the rectum and vagina. During the last three or four months, this operation, which is always more or less painful, has been repeated once or twice a week, and the reproduction of the tumor, at least to any considerable extent, has thus been prevented. Yet such is the tendency to inflammation in the diseased part, that cupping and bleeding, which have been practised during the course of this illness upwards of two hundred times, are still frequently required. Latterly also the functions of the urinary passages have become so much impaired that the use of the catheter is daily required; and an habitual state of pain and irritation have been induced, which

though not equal in intensity to the fits of pain formerly experienced, yet frequently require the assistance of narcotic medicines *. This unfortunate young woman has now had such a long experience of disease, and has become so familiarised with the mode of using palliative medicines, that she has for a long time been allowed to take Opium almost at her own discretion. But ever since she has become acquainted with the Stramonium, she has had recourse to it in preference. She takes it during the exacerbations of pain, in doses of from ½ grain to one grain of the extract from the seeds, or about double that dose of the extract made from the whole plant, either of which affords her more relief than even half an ounce of Laudanum, which she now occasionally takes at one dose without much effect. The Stramonium however uniformly affects her head and eyes, but this effect is only transitory. I one day requested her to take the Stramonium pill whilst I was in the hospital, in order that I might witness its immediate effect. In about 20 minutes after taking it, her eyes became dim like those of a person either extremely sleepy or in a state of intoxication, the pupils appeared somewhat dilated, and she seemed extremely languid and unwilling to speak. The pulse, which was rather quick, previous to taking

* It may be proper to observe that the affection of the urinary organs began long before the Stramonium was used; and that it evidently originated from the pressure of the tumor on the distended bladder.

the pill, had now become a little slower, though still rather above the natural frequency. In about half an hour however, all these effects had disappeared, and yet the relief obtained was still distinctly felt. Her bowels are generally open, sometimes relaxed, and scarcely ever require the use of aperient medicines.

CASE V.

Elizabeth Aines, æt. 27, was admitted into the hospital in June last, for pains of long standing, though of a very acute character, in the left loin, hip, and thigh, which symptoms appeared on examination to depend upon a disease of the hip-joint, the general constitution, however, having yet but little suffered. The Stramonium in this case, though used to a greater extent than in any former instance under my observation, did not afford any distinct relief. She began with ½ a grain of the extract from the whole plant, twice a day, the dose being gradually increased to one grain and a half, without any other perceptible effect than a slight momentary giddiness.

CASE VI.

William Brown, a sailor, æt. 32, had laboured for about four months under strongly marked Sciatica, combined with syphilitic pains, particularly in the shin bones. All the usual remedies, cupping,

blistering, antimonials, Guaiacum, and Opium, in pretty large doses, had been tried without effect. In the month of May last, some weeks after his admission, the pain having become almost intolerable, half a grain of the extract from the seeds of Stramonium, was ordered to be taken three times a day. The first few doses had no decided effect; but being increased to one grain, this dose, on the first trial, made him very uneasy for about half an hour, when he suddenly felt much relieved; and this improvement continued for many days, though the use of the medicine was suspended. He now only complained of weakness and numbness along the course of the sciatic nerve, which numbness however he had occasionally felt before he began to use this medicine.

About the end of June, when in this state of apparent convalescence, the pains in the hip and loins having returned with great severity, the Stramonium was resumed in doses of $\frac{3}{4}$ of a grain, three times a day. The rheumatic pains almost immediately abated, and on the 5th of July, he only complained of pains in his elbow joint, and shin bones, for which the blue pill was ordered, and the Stramonium was at the same time continued till the 22nd of July. At this period he complained only of weakness in his limbs, and the Stramonium was discontinued. He was discharged cured on the 11th of September.

CASE VII.

Justin Macarthy, æt. 56, was admitted on the 10th of July, having been ill about three weeks. He complained of excruciating pain in his right hip, thigh and knee, which I had first mistaken for Sciatica, but afterwards appeared upon examination to depend upon a disease of the hip-joint and thigh-bone. In this case Stramonium, though gradually increased to one grain, three times a day, afforded no relief to the patient, though it produced distinct giddiness and some rambling during his sleep. This man however, I cannot omit to observe, was most remarkably relieved by blistering the hip and the knee in succession, and he now complains, almost solely, of pain in the inguinal region *.

CASE VIII.

Christopher Russel, a poor man, aged 60, admitted on the 10th of July, had laboured about a fortnight under acute Sciatica, and had been blistered on the head of the femur without any benefit. After using a variety of medicines without effect, he was ordered on the 14th of May, to take half a grain of extract of Stramonium three times a day, and to suspend all other medicines. The

* A tumor has since appeared in the groin, from which matter has been discharged.

relief was immediate. He continued the Stramonium till the 25th of the same month, when it was omitted, the man being nearly well, and he was soon afterwards discharged free from complaint. The Stramonium, in this instance, removed the pain without producing any affection of the head.

CASE IX.

William Rawson, æt. 48, was admitted into the Hospital on the 10th of July, for a severe Sciatica of three months' standing. Various remedies having been previously tried without effect, $\frac{1}{2}$ grain of the extract of Stramonium prepared from the seeds, was ordered three times a day. The relief produced was very remarkable. In a few days he was able to walk out, and was soon afterwards well enough to be discharged. The Stramonium in this case occasioned only slight dizziness.

CASE X.

Lawrence Murry, æt. 34, was admitted a few weeks ago, labouring under excruciating pains, partly rheumatic, partly syphilitic, with extremely severe nocturnal exacerbations. He had kept his

bed constantly ever since his admission. He had taken a great variety of the usual anti-rheumatic and anti-syphilitic medicines, and had been slightly salivated twice, without permanent relief. Opium in pretty large doses was but of very little avail. At last he was ordered, one night at bed-time, to take one grain of the extract of Stramonium prepared from the seeds; but this dose produced so much dizziness and nausea, that although it sensibly mitigated the pain, it was thought necessary to omit it. A few days after this, however, the pains raging with increased violence, the Stramonium was again resumed, in the dose of ½ a grain, three times a day, with the very best effect. The giddiness induced by this dose was hardly perceptible, and he felt a greater relief at the end of two days, than he had ever experienced since his complaint began; he has since continued the extract for about a fortnight, together with Mercury, and is now in a convalescent state.

CASE XI.

A young woman was admitted a few months ago into the hospital by Mr. Astley Cooper, for a cancer in the left breast. Being repeatedly struck, on passing her bed-side, with her tears and her expressions of agony and despair, I inquired into the particulars of her situation, and found that she

was advised to quit the house immediately, her general health suffering materially from confinement, and the circumstances of her case not admitting of ultimate recovery. The surface of the breast had ulcerated, and had become exceedingly painful. The right breast had also become diseased, and Opium, Belladonna, and various other palliatives had been administered at different periods with very little advantage. I advised her to stay a few days longer in the hospital in order to try the Stramonium, small doses of which were immediately ordered. The result was that she soon found her pains very materially relieved by that remedy; and when I saw her again, a few days afterwards, she was comparatively serene and comfortable. Under these circumstances she left the hospital to go to the country. But I have just heard that she has lately fallen a victim to her disorder.

CASE XII.

The following case, in which Stramonium was used in *Tic douloureux* with evident benefit, being that of a lady, whose husband is a medical man of considerable experience and observation; and the outline of the case having been drawn up at my request by that gentleman himself, I shall lay it before the Society in his own words.

"The complaint in Mrs. S.'s face* began in the first week in Lent, and continued about eight weeks, when it appeared to have yielded to occasional doses of opium, and a mixture of Valerian, Camphor and Ether. During this period a plaster of Cicuta and Opium was applied to the face, and before it was removed produced active vesication. The relief however from this, if any, was but temporary. Mrs. S. now went into Hertfordshire, and the complaint returned in about a fortnight, which was probably induced by riding frequently in an open chaise in the high grounds of this country. The same remedies now having been again employed, afforded no relief, when recourse was had to the Stramonium, in doses of $\frac{1}{4}$ grain of the extract from the seeds, which afforded almost immediate cessation of pain, and was afterwards frequently resorted to for this purpose, and on no occasion was it necessary to repeat it more than a second time after an interval of two hours. The Stramonium never produced any inconvenience, and never failed of relief; so much was this depended on, that Mrs. S. never went without some of the pills in her pocket. It was now thought that the complaint in the face might be connected with spasms in the stomach, to which Mrs. S. had been for some years subject, and which were con-

* This lady was seen by several medical men, and amongst others by Mr. Astley Cooper, who did not hesitate in considering her as labouring under *Tic douloureux*.

nected with a costive state of the bowels. With this view she was advised to adopt a mild mercurial regimen (the blue pill), and appeared to derive considerable benefit from its continuance. At present she has discontinued the mercurial plan for about two months, and had been free from the complaint some time before. It may be necessary to mention that, during the first attack, the Bark was taken in large quantity. The arsenical solution was also used, till it disagreed so much as to oblige us to leave it off. Thus although the mercurial plan appears to have produced the most permanent advantage, yet it must be confessed that the effect of the Stramonium was extremely beneficial in affording immediate relief when the pains were excruciating."

CASE XIII.

Encouraged by the effect of Stramonium in the case I have just related, Mr. Astley Cooper was induced to recommend to my care Miss D. (who had laboured for some years under a severe and aggravated form of the same disease), with a view to enable me to give that medicine another trial in this obstinate disorder. In this instance however, it failed entirely of producing relief; or rather the patient, a person of the most highly irritable nervous habit, could not bear its effects even in

the minute dose of $\frac{1}{8}$th of a grain. It produced great affection of the head and of the stomach, and such a general nervous agitation as could not be endured; and the medicine was abandoned without having produced the least benefit.

CASE XIV.

Another, and more promising opportunity of trying the effects of Stramonium in *Tic douloureux*, was afforded me a few weeks ago, by the recommendation of Mr. Cooper. The subject of this case is a gentleman whose general health appears perfectly good, though he has been frequently tormented, for about three years past, by severe paroxysms of *Tic douloureux*. Between the two or three first attacks, intervals of several months intervened; but for the last 15 or 16 months the complaint had continued without any complete intermission, though varying considerably at different times, as to its violence and character. Having been himself a medical man, and acquired great eminence and celebrity in a particular branch of the healing art, this gentleman had been extremely active in trying all the remedies that have been recommended in this disorder; but had failed in obtaining permanent relief. Early in August last, he began to take the extract of Stramonium prepared from the seeds,

in the dose, first of $\frac{1}{4}$ of a grain, and soon afterwards of $\frac{1}{2}$ a grain three times a day; and his first report was that in the smaller dose it had produced no relief, but that the benefit obtained from the larger had been very considerable. The remedy had been attended with no sensible inconvenience, and had produced rather an aperient effect. At this period however the patient went to the continent, and I was no longer favoured with direct accounts of his proceedings. But as he has lately written to a friend that his face is very much better, and that he continues the Stramonium regularly, it is reasonable to hope that his case will afford another instance of the beneficial effects of this remedy *.

Thus from the facts I have just laid before the Society, (the only ones that have yet come under my own observation respecting the effects of Stramonium,) it would appear that in four cases of Sciatica decided benefit was obtained. The efficacy of this remedy was still more strongly marked in two cases of Sciatica combined with syphilitic pains. It

* Since this was written, another letter of a more recent date (September, 1816) was received from that gentleman, which considerably diminishes my hopes of the ultimate success of Stramonium in this case. He says, "My face is still indifferent, though upon the whole rather better than when I left England. I have continued the Stramonium, and now take between *five* and *six grains* every day, but without any perceptible effect." It appears from the same letter that the preparation of opium called 'the blackdrop' generally pr oduces relief.

failed entirely in two instances of diseased hip-joint. It produced considerable relief, as to pain, in a case of supposed disease of the spine followed by Paraplegia; and likewise in one of Cancer of the breast. It allayed materially the pain occasioned by an acute uterine disease. It was of great and repeated utility in a case of *Tic douloureux*; its utility in a second case of the same description was very doubtful; and in a third, it entirely failed.

It may perhaps appear to this learned Society, on a first view of the subject, that the addition of a narcotic plant can hardly be considered as a new or important acquisition in practice, since we are already possessed of a variety of powerful and efficacious medicines of the same class. But if this remedy should decidedly prove, upon further trial, to produce the effects I have described, and in particular to allay pain, without inducing constipation or lethargy, I cannot help flattering myself that it will be found to afford, at least, a valuable palliative.

Postscript. After the two first sheets of this paper were printed off, I heard that the name of the Medical Gentleman alluded to in page 559, was Mr. Norwood, of Ashford, in Kent.

Supplementary Observations to the Paper on the Structure of Bone: (*p.* 387.) By John Howship, Esq.

In my inquiry into the mode in which ossific matter is deposited in growing bone, I thought it right to endeavour to ascertain how far the appearances of this process in the larger quadrupeds and in the cetacea, were similar to those observed in the human subject; and to determine, if possible, whether such appearances might be considered as arising from a general principle in the economy of nature. Upon the same ground, it appeared right to inquire whether the structure and organization of full grown bone were formed upon one and the same model in the larger, and in the smaller classes of animals. With a view to the clearing up this point, I have, since my observations on the structure of bone were read to the Society, made the following examinations, a short account of which I beg leave to subjoin in this place by way of appendix to that paper.

Transverse sections were taken from the humerus of a full grown lion, the femur of a young elephant, and the margin of one of the ribs of an enormous whalebone whale, that was between 90 and 100 feet in length. In each animal the most compact part of the bone was selected; and the specimens, after being examined in the microscope, were calcined, and prepared so as to exhibit to the greatest advantage the course and appearance of the longitudinal canals. Nothing, however, differing in principle from what has been already related, was discovered. In each instance, the canals were observed to be stored with an abundant supply of white concrete medullary matter; in each, the different parts of the canals varied in their dimensions; in all, the surfaces of the canals were particularly smooth, and of a polished appearance; and in all, there were numerous lateral communications.

In the lion, however, these canals were found to be smaller in diameter, than is usual in proportion to the size of the bones, and they were also less numerous than in most other animals that I have examined: appearances which are perfectly consistent with the highly interesting observations on the structure of bone, in the Lectures on Comparative Anatomy, by Sir Everard Home, the extent and success of whose labours have proved worthy of so magnificent a subject, as the collection of the late Mr. Hunter.

In the elephant, and the whale, they were remarkably large and distinct, so as to bear a just proportion to the magnitude of each of these animals; they were of course many times larger than any I had before seen, although in every other respect precisely the same.

REFERENCES TO THE PLATES.

Plate V. *Fig.* 1. Is the sketch of the incision in the iris, recommended by Professor Scarpa. See page 318.

Fig. 2. Represents the *presse artère*, employed by Mr. Crampton in the operation for Aneurism, as described p. 365.

A. The stalk of the instrument with a hole at E, sufficiently wide to admit of the passage of the crossed tapes.

B. The foot of the instrument with holes at FF, for the passage of the tape.

C. A screw, by a turn or two of which the tapes are secured at E, when drawn to the required tightness.

D. The tape $\frac{1}{8}$ of an inch in breadth.

E. The hole through which the tapes are crossed.

Plate VI. Represents the appearances of sections of bones in the solar microscope, referred to in Mr. Howship's paper, p. 387.

Fig. 1. Part of a transverse section from the humerus of the ox, upon the surface of

which is a small square, that includes the portion which was examined in the microscope.

Fig. 2. The magnified appearance of the vessels contained within the square marked upon the surface of the figure A, as seen by the compound microscope.

Fig. 3. The appearance of the same figure subsequent to calcination, exhibiting the true proportional magnitude of the canals, within which the vessels were previously apparent, although in its recent state it was impossible to discern the medullary contents.

Fig. 4. Part of one of the sections of the same bone, from which the former figures were taken; the preparation of which was accidentally more fortunate than the rest, so as to expose an undisturbed and complete view of the soft medullary contents of the canals in the bone.

Fig. 5. This figure exhibits a very exact representation of the magnified appearance of the square marked upon *Fig.* 4. and it demonstrates two circumstances of consequence; the first is that the diameter of the vessels bear a very small proportion to that of the canals through which they pass; the second is that where the canals are sufficiently large to be tolerably distinct, the blood-vessels are observed to be distributed in pairs, the one in all probability being

the artery, the other the vein; at least this appears to be the case in the large canal upon the central part of the figure, judging from the disparity between the diameters of the two blood-vessels seen within its cavity.

Fig. 6. A longitudinal section of the humerus ¼th of an inch in length, from the human subject, glued on a piece of wood. From this specimen twenty successive sections were traced, and the drawings completed; the first of which is given in *Fig.* 7. as a specimen of the general appearance of the longitudinal canals; the objects are here represented magnified 10 times in each dimension; or 100 times in surface.

Fig. 7. The appearance of the first section when magnified by the solar microscope.

a. The margin of the section that was towards the medullary cavity of the bone.

b. The margin of the section which forms the external surface of the bone, covered by the periosteum.

c. The particular canals selected for the illustration of the figure and appearance of these tubes.

Fig. 8. Exhibits the aggregate form and appearance of canals selected for the purpose from the above-mentioned series of figures. The

mode of producing which is described in the paper, p. 401.

Plates VII, VIII and IX. Refer to Mr. Stanley's paper on the condition of the bones in rickets, p. 404.

Plate 7. Represents the section of a ricketty bone in its softened and diseased state.

Plate 8. Represents the section of a femur in which the ricketty disorder having ceased, the bone has acquired its necessary strength and power of resistance by the greater thickness of the walls in its interior curve.

Plate 9. Represents a section of the tibia from the same subject as the preceding. The bone having become bent into an angle and acquired a flattened form; by the deposition of earthy matter into its medullary cavity, it is now rendered solid for some extent above and below the part where it had yielded.

Plate X. Represents the appearance of the bands in the cases described by Mr. Earle in his paper on contractions succeeding to ulcerations of the skin.

Fig. 1 and 2. Refer to *Case* I. described p. 411.

Fig. 3. Refers to *Case* II. p. 416.

Plate XI. Refers to Mr. Langstaff's description of an extra-uterine fœtus contained in the fallopian tube, p. 437.

Fig. 1. A posterior view of the uterus described in the above paper.

a,a. Parietes of the uterus cut open to shew its cavity.

b,b. Fimbriated extremities of the fallopian tubes.

c. Distended part of the fallopian tube containing the ovum.

d,d. Lacerated openings.

e,e. Ovaria cut open.

f. Recent corpus luteum.

g,g. Old corpora lutea.

Fig. 2. An anterior view of the fallopian tube, with the fœtus and its involucra displayed.

h,h. The expanded parts of the fallopian tube, which was laid open nearly from its extremity to where it is obliterated, exhibiting the altered condition of the parts containing the ovum: the chorion, amnios and embryo are also shewn.

i. Bristle denoting the open state of the inferior part of the fallopian tube, and its natural plicated appearance.

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ERRATA.

Page 108,	*line* 20,	*for* J. Cooper,	*read* S. Cooper.
——	26, —	section,	—— portion.
		sterno cleido,	—— sterno-cleido-mastoideus.
	27, —	platonic,	—— platysma.
110, ——	4, —	light,	—— right.
116, ——	4, —	tuberculi,	—— tubercles.
415, ——	4, —	coryra,	—— coryza.
420, ——	15, —	wrists,	—— wrist.

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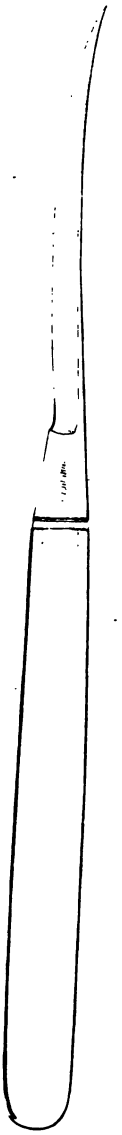

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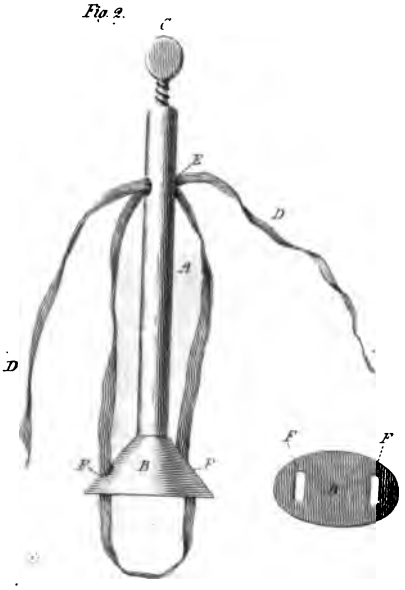

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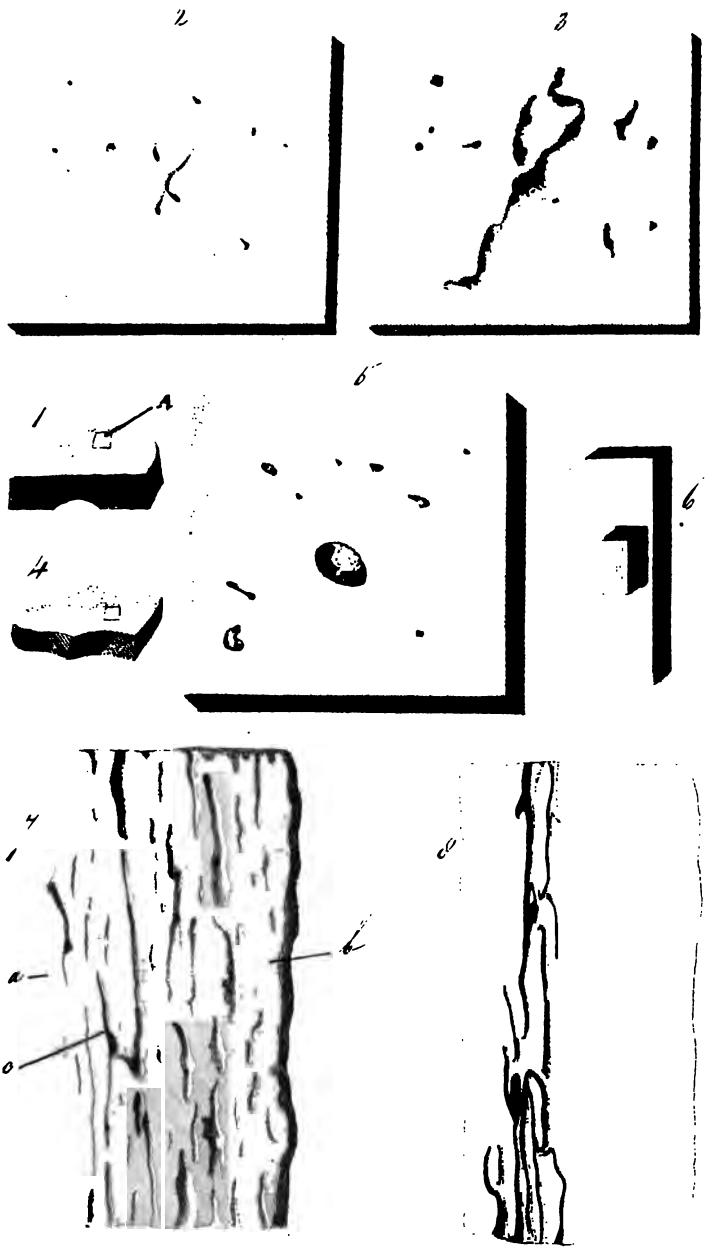

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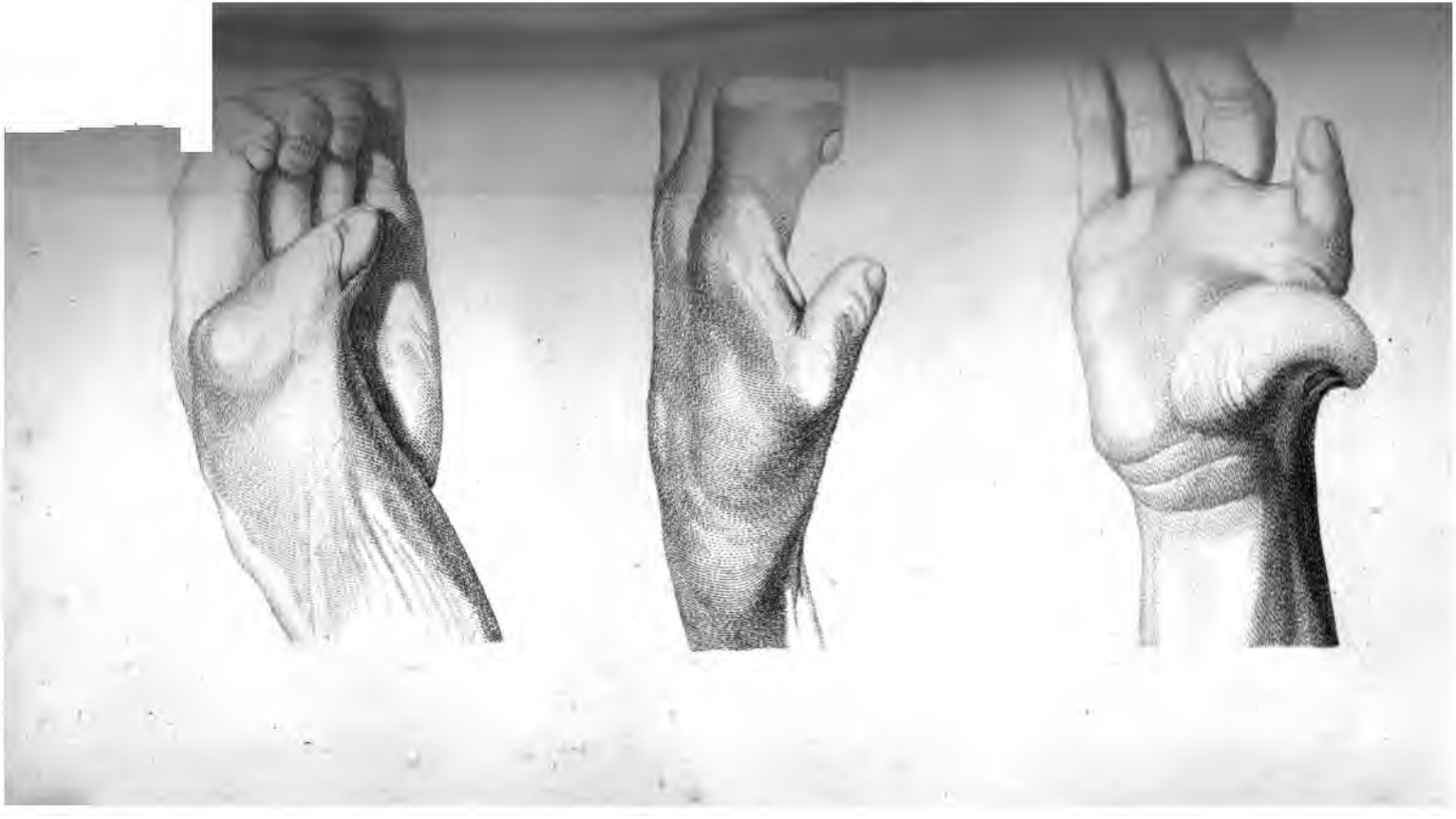
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